



sequent studies of a similar nature have been undertaken by a number of medical societies and city, county, and state health departments in their own localities, using the same schedule that was devised for the larger study. The White House Conference on Child Health and Protection has published a committee report containing a frank account of the failings of obstetric education in this country and recommendations for its improvement. Large attendance is reported at graduate courses in obstetrics which have been offered to physicians by state boards of health and county medical societies in a number of places. State boards of health have continued their efforts to train midwives in places where the midwife still exists. . . .

The fact that during the period 1921 to 1929 there was a significant downward tendency of about 2 per cent a year in the deaths due to albuminuria and convulsions, which may largely be prevented by prenatal care, would seem to indicate that popular education in this respect is bringing results. Recent surveys show, however, that even now the great majority of women do not receive such care, and it is of great importance that facilities for education in maternal health should be increased. . . .

The Children's Bureau has three projects for promoting uniform reporting of statistics relating to children and child welfare. In 1920 it began to assemble and analyze reports on the issuance of work permits as a means

of providing current information regarding the number of children receiving official permission to leave school for work. In 1927 it began to assemble reports from juvenile courts and to work out with the courts uniform practices in defining and recording cases, so that comparable delinquency trends would be available. Finally, in 1930, it took over the project for current reporting in selected metropolitan areas in some 22 fields.

The closing statement of this illuminating report should be taken seriously to heart by everyone interested in the welfare of the child.

Child welfare workers everywhere look to the coming year with much anxiety. It will take great effort to maintain the standards of service for children which were slowly developed during the years before the depression, to make sure that their interests are safeguarded in the general economies which the depression has made necessary. Neglect of the health, education, and general welfare of children will be permanently costly to the children and to the future of the country.—

*Twentieth Annual Report of The Chief of The Children's Bureau to the Secretary of Labor, Fiscal year ended June 30, 1932. United States Government Printing Office, Washington, 1932.*

## PUBLIC HEALTH NURSING\*

**Twenty Years of Red Cross Public Health Nursing**—In 1910 Lillian Wald, R.N., who was responsible for the establishment of the Henry Street nursing service and the school nursing service in New York City, wrote Jacob Schiff, one of the farseeing members of the Board of Incorporators of the American Red Cross, thus:

In the older countries armies of trained nurses are sent into remote country regions to nurse, to educate, to bring scientific, advanced humanitarian and sanitary messages to the public. In America, in a few sporadic instances only, are nursing care and protection against infection possible to the sick

country person. . . . Why should not the Red Cross Society undertake the organization of a vast, far-reaching scheme of country nursing, getting such support and coöperation as may be possible from the dwellers in mountain, farming or lonely desert regions, coördinating and guiding all, and bringing the help of the nurse to scattered, isolated families? . . . There could be no larger or nobler work possible to the Red Cross Society of a country dedicated to peace.

This letter was presented at the annual meeting of the Red Cross, but no action was taken until the annual meeting the following year when Mr. Schiff offered \$100,000 to start the enterprise and Mrs. Whitelaw Reid offered \$10,000 for scholarships to prepare nurses for rural nursing. A trial year was agreed upon and was so successful that in 1913

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.



AMERICAN  
JOURNAL OF PUBLIC HEALTH  
*and*  
THE NATION'S HEALTH

failing and the continuation of many rural public health nursing services is in danger these nonofficial agencies are again filling the breach until they can again be officially resumed. E. F. M.

**Why Not Make Use of the N.O.P.H.N.?** — Katharine Tucker, R.N., general director of the National Organization for Public Health Nursing, who was appointed a member of the New York State Health Commission by Governor Roosevelt, has been appointed consultant in public health nursing to the State Department of Health.—*Health News*, New York State Dept. of Health, IX, 44:179 (Oct.), 1932.

To anyone who knows how haphazardly public health nursing started and is being carried on in many state health departments, the arrangement made between the New York State Health Department and Miss Tucker will have a strong appeal. Let us hope that it will set a precedent for other states to follow.

**As a Private Physician Sees Us—** If one physician asks another what he thinks of public health nursing he is apt to be greeted with a stare that asks "Now what are you about to start?" Then he probably replies that he knows very little about it. Sometimes he may remember a personal experience with a nurse when she was believed to have done such and such and said so and so.

In Toronto a physician thinks of a public health nurse as one who spends her time in teaching rather than in nursing. Members of the Victorian Order or the St. Elizabeth Order do not usually occur to him as being public health nurses. He does not know how the teaching nurse spends her day, and what he hears about her comes to him second hand. She is a member of a group; he is on his own. He fears her because he does not know her and because she appears less as an indi-

vidual than a group member. If he could only know her as an individual his apprehension about her activities would probably fade away.

A nurse can make no better contact with a physician than to be present at a confinement in a private home. Yet very few public health nurses are in delivery service. It is very seldom that the nurse who gives prenatal supervision to a patient does the actual obstetrical nursing also. There may be another nurse who does the follow-up infant welfare work. The continuity of favorable relations between one physician and one nurse is broken and the arrangement makes the physician seem unimportant.

It is astonishing how long a doctor remembers an indiscretion of a public health nurse. It makes him twice shy of her. Every doctor should be asked to report any indiscretions on the part of nurses to their organization so that misunderstandings could be adjusted at the beginning.

It would be good for the doctor to know of the nurse's constant attempt to refer his patients to him, keeping herself in the background; it would help a great deal if he could know what the nurse is able to do for him. He already makes use of the public health laboratory; he should make equally good use of the public health nurse in getting her to see that the families he is attending carry out his instructions. But how can he be assured that she will not give advice to his patients without his expressed desire unless he knows her well enough to trust her?

The doctor gets a long distance view of public health nurses busying themselves with what appear to him as trivialities. For much of this work he cannot see the need of a nurse's training.

A doctor's survival in his profession depends on whether his advice is accepted, the public health nurse's does not. In her zeal to help a family in-



# EDUCATION AND PUBLICITY\*

**In Magazines and Books**—We would like to record books and magazine articles about health and health workers. Please tell the editor when you discover anything, either sympathetic or otherwise.

"The Nurse in Current Fiction" reviews four books: "Hospital," by Truax; "District Nurse," by Baldwin; "Miss Pinkerton," by Rinehart; "The Affair at Tideways," by Heath. *Trained Nurse*. Aug., 1932.

## A Publicity Council In Your City?

—Sixteen cities have social work publicity councils. Health workers are prominent in most of them. Why not a health education group in every one of them? Health workers have much to gain from general discussions of interpretation, education or publicity. Also there is much to gain in small groups getting together to study health education as such. Where the chest or council of social agencies has not formed a publicity group those interested in health publicity and education might bring it about. Plans for such groups will be supplied by Social Work Publicity Council, 130 East 22d St., New York.

## Posters From Far and Near—

Through the courtesy of League of Red Cross Societies and other health agencies, several years ago *Hygia* reproduced in miniature some of the world's best health posters. Only recently did we learn that those reproductions are available on a set of sheets, 8½" x 11½", at 25 cents. Address *Hygia*, 535 North Dearborn

St., Chicago. While much reduced in size, the original brilliant colors are preserved. The 44 posters came from Bahia, France, Germany, China, Lithuania, Russia, India, Japan, and Latvia. The posters from India and Russia deal with prenatal care, but the remainder are suitable for home and school use. Children will delight in studying the Chinese poster lesson in hygienic eating with chopsticks, and the colorful Japanese posters on swatting the fly and brushing the teeth. The happy French posters on bathing and outdoor sports, the German mother, the Lithuanian "little mother," and the grotesqueries from far-off Bahia will appeal to the children.

## What to Tell About Public Health

—The freshest collection of quotable and usable material is contained in the series entitled "Behind the Front Lines," issued by Association of Community Chests and Councils, Graybar Building, New York. Subjects: "Child Health," "Hospitals," "Mental Hygiene," "Public Health Nursing," "Social Hygiene," "Tuberculosis." Write your national, or send 10 cents a copy for any of these bulletins.

## The "Smithson Family" In Connecticut—

The summer experiences of the "Smithson family" were revealed by radio last July, August and September. The State Department of Health caught them via the microphone for 5 minutes every Wednesday according to the following schedule:

The family is discussing vacation.

They enjoy a picnic lunch.

They take Aunt Adelaide who does nothing but talk about her grandchildren. A. Elizabeth Ingraham, M.D. (as Aunt Adelaide).

They stop for advice at health officer's

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

January, 1933

Number 1

### CONTENTS

	PAGE
Effectiveness of Child Health Programs in Ontario by Survey Methods . . . . .	1
<i>John T. Phair, M.B., D.P.H.</i>	
The Addition of Vitamin D Concentrate to Milk . . . . .	10
<i>Theodore F. Zucker, Ph.D.</i>	
Nutritive Value of Cranberries . . . . .	13
<i>Carl R. Fellers, Ph.D.</i>	
Laboratory Diagnosis of Endemic Typhus and Rocky Mountain Spotted Fever . . . . .	19
<i>L. F. Badger, M.D.</i>	
Statistics and the Health Officer . . . . .	28
<i>George B. L. Arner, Ph.D.</i>	
Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine . . . . .	35
<i>W. L. Mallmann, Ph.D., and William Cary, Jr.</i>	

### EDITORIAL SECTION

Prevention of Rickets . . . . .	45
Mottled Enamel . . . . .	47
Bernhard Bang . . . . .	48
Association News . . . . .	50
William Hallock Park, M.D. Long and Continuous Service (Dr. G. D. Lummis). New Members.	

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Executive Office, 450 Seventh Avenue, New York, N. Y.

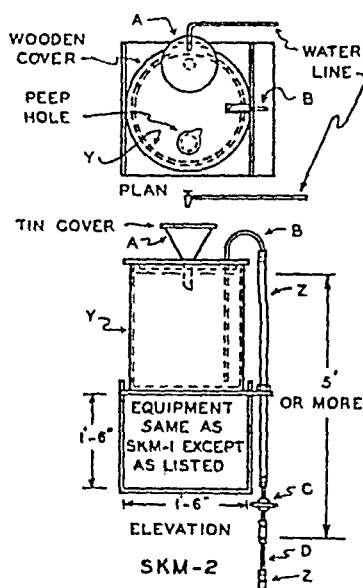
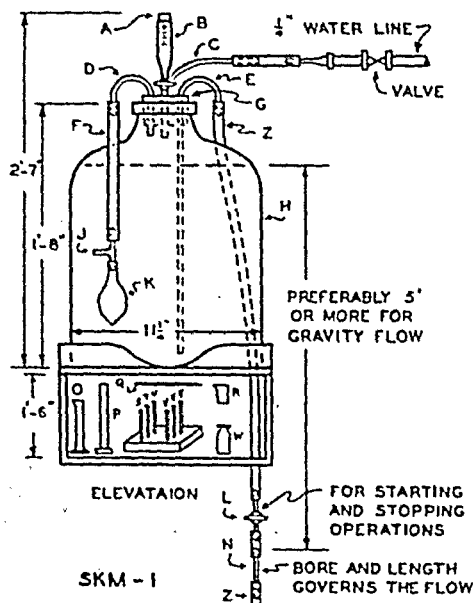
NOTICE:—Subscription \$5.00 per year for United States, Canada, Cuba, and Mexico and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Application for change of entry as second-class matter from Lancaster, Pa., to Albany, N. Y., pending.

FIGURE 1



in flow of only 0.24 per cent per centigrade degree of temperature. This would be of no consequence within the range of temperature under which the device would be operated.

It was first thought that calcium from the hypochlorite solution would deposit on the inside of the capillary tubing. In such an event it was planned to instruct the operator to replace the tube frequently and soak the used tube in vinegar (or acetic acid) over night and then flush it with water. Experience has shown that there is little or no tendency for deposits to collect on the inner surface of the tubes, even where the hypochlorite is made locally from the high test powdered products. Apparently a scouring velocity occurs in the tube. In one installation using 18" of 3/4 mm. capillary tubing and in another using 12" of 1 mm. tubing, replacements were made only after daily use over periods of 6 and 8 months respectively.

Although the above indicates that the deposition of calcium is not a factor, it is advisable to make the stock solution of hypochlorite as clear as practical, to

use a clear water in preparing and diluting the hypochlorite and to replace the capillary tubing at regular intervals, such as once a week or once a month. The tubes cost but \$.20 each; so therefore breakage in handling is of no importance.

#### THE EXTENT OF USE

This device, in one or the other form, has been in use by the federal government on one installation during a period of more than 2 years, on another installation during a period of over 1 year, and on two other installations during a period of over 6 months. Four installations were recently made at Indian Emergency Conservation Camps and the equipment has been purchased for four additional installations by federal officials who were convinced of the practical application of the device through observation of the earlier installations.

The rate of flow treated in these cases ranges from 4 gal. to 60 gal. per minute. The device is not particularly limited to low rates of flow. By feeding undiluted 14.5 per cent hypo-



# RETEMPERED— for Assured Strength

THE new Kimble Exax Blue Line of Graduated Glassware not only excels in fine appearance, but is outstanding in its durability and constructional strength. Every piece receives the exclusive Kimble

re-annealing treatment—a re-tempering process, in a special lehr or oven, that removes all strains, and insures against weak spots and excessive breakage.

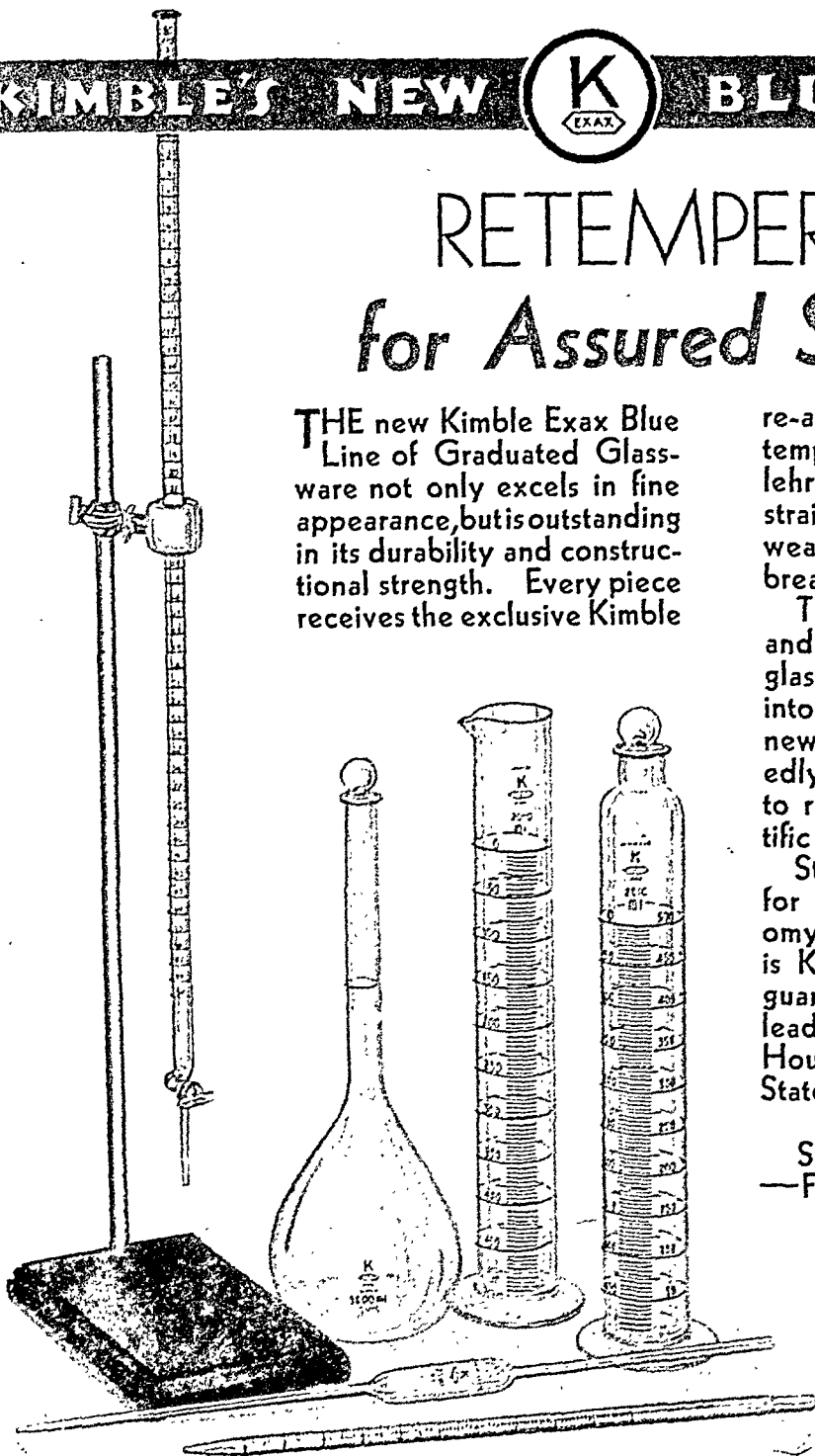
The blue calibration lines and numerals—formed by real glass enamel actually fused into the glassware—make the new Kimble Exax Line decidedly more practical and easier to read than any other scientific glassware.

Standardize on Blue Exax—for service, durability, economy and assured accuracy. It is Kimble-made and Kimble-guaranteed. Available at all leading Laboratory Supply Houses throughout the United States and Canada.

Specify and use Blue Exax  
—FOR ASSURANCE!

**BLUE  
LINE**

Leading Laboratory Supply Houses throughout the United States and Canada carry full stocks of the new Blue Exax Line for your immediate service. Prices and specifications upon request.



# KIMBLE GLASS COMPANY

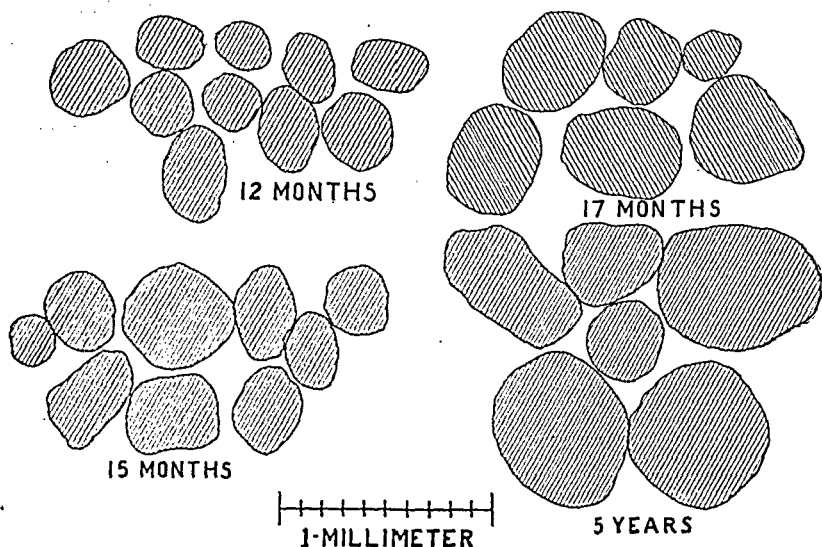
VINELAND, NEW JERSEY.



New York, 1440 Broadway; Philadelphia, 1616 Walnut St.; Boston, 131 State St.; Chicago, 23 N. Desplaines St.; Detroit, General Motors Bldg.

FIGURE I

Camera Lucida tracings of silicotic nodules at various intervals of exposure. The nodules from the ordinary case of silicosis are larger than the entire area of this figure.



the nodules encountered in any lung are quite uniform in size and that small, apparently fresh nodules are relatively rare after prolonged exposures.

In the cases under discussion the nodules are massed in a compact zone, a centimeter or more in width, beneath the pleura. Along many of the interlobular septa there are wide bands of closely packed nodules which encroach upon the parenchyma on either side. In such formations the lesions are surrounded and embedded in sheets of loose cellular or hyaline connective tissue containing appreciable quantities of fine black dust particles. A few nodules also occur singly or in small clusters throughout the alveolar tissue. When stained by Foot's method for reticulum, the impression is gained that the reaction is relatively young, for black staining reticulum predominates over red stained collagenous elements. In many air spaces are masses of necrotic exudate which may be produced by the action of silica. The polarizing microscope reveals excessive amounts of exceedingly fine, doubly refractile particles with

relatively few of the large acicular and needle-like fragments which are so common in the ordinary silicotic lesions. In the case of the 2 white tunnel workers who admitted having had 4 to 7 years previous employment in coal mines, the silicotic nodules are 4 or 5 times as large and frequently occur as aggregations surrounded by a capsule of cellular connective tissue.

In all cases the interalveolar septa are generally thickened. In the presence of chronic infection it is impossible to estimate how much of this change is due to the silica, but when the infection is acute and exudative it probably has little effect upon the pulmonary framework. The bronchial lymph nodes were available for examination in 13 of the cases, and among these only 61 per cent showed definite silicotic nodules. In each instance at least 3 different nodes were examined.

In all of the cases death was due to pulmonary infection; in 11 this was definitely tuberculous; in 2 there was an acute and chronic non-tuberculous pneumonia, and in the other 3, tuber-



Letter to the Editor (Cleanliness Institute) . . . . .	53
Public Health Administration— <i>Henry F. Vaughan, D.P.H., and Ira V. Hiscock</i> . . . . .	54
Anderson County, S. C., Health Unit. Rockefeller Foundation. Medical Participation in School Health Service. A Revenge Epidemic, Greenville, S. C. A Recreation and Health Project. Bridgeport, Conn.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	56
Report of the Referee on Oyster Analysis— <i>Fredric P. Gorham, Referee.</i> Apparatus for Study of the Bacterial Behavior of Air— <i>W. F. Wells.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	59
Increased Tuberculosis Mortality in Young Women in England. Aviation Mortality in 1931. A Comparative Study of Acute Anterior Poliomyelitis in Philadelphia in 1916 and 1932. A Tuberculosis Survey of the Territory of Hawaii, 1931. Hospitalization of Mental Patients.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	63
Reports of Committees—Public Health Engineering Manual, <i>A. E. Gorman, Chairman</i> ; Sewage Disposal, <i>Langdon Pearce, Chairman</i> ; Fellowship and Membership, <i>L. H. Enslow, Chairman.</i>	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	66
Chronic Poisoning by Oxalic Acid. Asphyxia From an Unexpected Cause. Carbon Monoxide Survey in Liberty Tubes, Pittsburgh. Modified Form of the Greenburg-Smith Impinger for Field Use, with a Study of Its Operating Characteristics. The Quantitative Determination of Fine Soot Inhaled by Man. The Problem of the Possible Health Hazard of Lead-Weighted Silk Fabric. The Determination of a Single Index of Atmospheric Conditions in Relation to Physiologic Effects. Studies of School Ventilation. Six Years of Tannic Acid Treatment of Burns. Shorter Work Periods in Industry. A Microscopic Study of the Tissues of the Albino Rat Following the Ingestion of Aluminum Salts.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	70
The Vitamin A, B, C and G Content of Concord Grapes. The Importance of Temperature on the Survival Time of Bacteria in Acid Foods. The Vitamin B and G Content of Raw and Cooked Broccoli. Vitamin C in Canned Citrus Products. Rickets in Rats, XIII—The Effect of Various Levels and Ratios of Calcium to Phosphorus in the Diet Upon the Production of Rickets.	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	72
Child Labor and Child Health.	

Continued on page viii

Reprint prices furnished upon request

During periods of use, swimming pool water showed marked pollution as measured by colon bacilli and streptococci indices in the presence of residual chlorine contents of 0.2 to 0.5 p.p.m. . . .

A sodium thiosulphate treated sample bottle was recommended for collecting pool samples.

Because of the several advantages to be gained in using chloramines over the use of chlorine alone, and because of the above conclusions, it was decided to carry on the following studies relative to the use of chlorine and ammonia in connection with the routine control of all swimming pools during the months of June, July, and August, 1933.

1. Collect duplicate samples for every sample taken this season during times of swimming—one sample to be handled in the usual manner and tested after the inspector reaches the laboratory and the other sample collected in sodium-thio-sulphate treated bottles.

2. Run several laboratory tests to determine if sodium thio-sulphate treated bottles had any disinfecting effect on samples collected between the time of collection and the time of delivery at the laboratory.

3. Check at intervals the increase in the free ammonia content at those pools using chlorine and ammonia treatment where the water was recirculated and not completely drained in several weeks or longer.

4. The control of slime or algal growths on the bottom and sides of pools by using:

- a. An increased dose of chlorine.
- b. By the use of copper sulphate.

#### DETAILS OF THE STUDIES

##### *Study 1. Comparison of Samples Collected and Tested in the Usual Manner and Those Collected in Sodium Thio-sulphate Treated Bottles—*

Two duplicate samples were collected twice a week from each pool. Two samples at each inspection collected and handled in the usual manner and tested after reaching the laboratory and two other samples collected in sodium thio-sulphate treated bottles.

In the selection of a dechlorinating agent, the following chemicals were considered: sodium thiosulphate, sodium

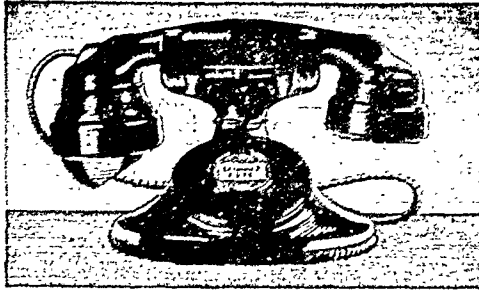
bisulphite, and sodium sulphite. Sodium metasilphite (which had been recommended to us by Dr. Schmelkes), was not obtainable on the market except as a special order in large quantities (J. T. Baker Chemical Co., Phillipsburg, N. J.). Of the three substances considered as antichlors, sodium thiosulphate seemed to be the most satisfactory for routine purposes. Both sodium bisulphite and sodium sulphite decomposed under steam sterilization and lost practically all of their dechlorinating power, a difficulty which was not encountered with the thiosulphate. While either the bisulphite or the sulphite could no doubt have been used under special conditions of preparation, for the purposes of routine use, the thio-sulphate offered distinct advantages.

#### PREPARATION OF THIOSULPHATE

##### TREATED SAMPLE BOTTLES

Ordinary 4 oz. wide mouth bottles with tinfoil covered corks and hood of heavier lead foil were used for collection of samples. The bottles were sterilized as usual in the hot air oven; 1.5 gm. of crystallized sodium thio-sulphate were dissolved in a liter of sterile water and 1 c.c. of the solution added to each bottle; the bottles were then autoclaved for 5 min. at 15 lb. steam pressure. Bottles were freshly prepared for periods not exceeding 2 or 3 days but the stock solution of sodium thiosulphate was used over a longer period of time.

Chart 1 represents the results of 42 samples collected from 2 swimming pools where chlorine was used alone without the addition of ammonia. Average bacteria counts are plotted as the abscissa and the chlorine residuals as the ordinate. These studies showed that at a residual of 0.1 p.p.m., the average count was 6 and no single sample was above 12. Forty-two portions were run for *B. coli* content and all were negative. Chart 2 represents the re-



# Making the telephone MORE VALUABLE to more people

*The constant purpose of the Bell System is to make the telephone worth more and more to all who use it. To that end eight helpful ways to increase the usefulness of the telephone in your home or office are listed below. . . . Some of these you may know. Others may come as a welcome surprise—as something you often have wished for without knowing it is so readily available.*

**Extension Telephones.** A great convenience in bedroom, kitchen and living-room. Make stair climbing unnecessary. Improve business efficiency in the office. Save many steps every day.

**Hand Telephones.** Modern. Distinctive in appearance. An attractive addition to any room. Leave one hand free to take notes while telephoning.

**Portable Telephones.** Plug in the wall like a lamp. May be moved from one room to another as needed.

**Individual Lines.** Cost little more than party line service. Assure additional privacy. Your line is "busy" only when you use it.

**Intercommunicating Facilities.** Provide for making calls from one part of the home or office to another or transferring of incoming calls without the aid of the central office operator. Save time and steps and lead to a quiet, smooth-running establishment.

**Additional Bell Signals.** For use in noisy locations or where it is necessary to summon people from a distance to answer the telephone.

**Additional Directory Listings.** Enable friends to locate you even though the telephone is in the name of husband, brother or sister, or another relative. In addition to the firm's name, your own can be shown. Direct business to you. The cost is small.

**Telephone Planning.** The telephone company in your city will gladly assist you in planning the most convenient telephone facilities for your home or office. The services of telephone experts are at your disposal.

---

*Call the Business Office of your Bell Telephone Company for full information about any of the services listed above.*

---

AMERICAN TELEPHONE AND TELEGRAPH COMPANY



free ammonia tests were made on this date for this pool, but based on the results of a number of such tests made on several pools during this summer, it seems reasonable to assume that the free ammonia content was not over 1 p.p.m.

No pH tests were made on this pool on or near this date. Forty-five routine tests for pH were made during the summer of 1932 and these averaged 7.6, with a minimum of 7.3 and a maximum of 8.2. After checking the probable pH and free ammonia content of the pool on this day, it was decided that the water probably had a normal pH and free ammonia content.

The portion which showed positive for *B. coli* at 0.5 residual was collected from an outdoor pool on August 18 at 3:30 P.M. The counts for the dechlorinated samples were 40 and 8 with 1 portion positive for *B. coli* and 1 portion negative. The counts for the ordinary samples were 18 and 5 with both portions negative for *B. coli*. Unfortunately the records kept do not show the last date that the pool was drained previous to the collection of these 2 samples, nor did they show the pH of the pool water nor the free ammonia content. A free ammonia test on August 23 at this pool showed 1.04 p.p.m.

*Study 2. Laboratory Tests to Determine If Sodium Thiosulphate Treated Bottles Had Any Disinfecting Effect on Samples Collected—*

The amount of sodium thiosulphate used was found to be sufficient to dechlorinate 100 c.c. of water immediately and completely, in which the residual chlorine, as determined by the orthotolidin test varied from 0 to 1.5 p.p.m. of residual chlorine. There was always a considerable excess of thiosulphate present after dechlorination was complete. Experimentally the amount of sodium thiosulphate was sufficient to

dechlorinate 100 c.c. of water or the capacity of the 4 oz. collecting bottle containing approximating 3.5 p.p.m. of residual chlorine.

With an excess of sodium thiosulphate present and the several products of the reaction involved in the dechlorination process, which probably include sodium tetrathionate, sodium sulphate, and sodium chloride, the question naturally arose regarding the possibility of sterilization or temporary inhibition of bacterial life in the dechlorinated samples. In an effort to determine whether or not the dechlorinating action or any of the end-products formed exerted a sterilizing effect, the following checks were made:

Approximately equal suspensions of bacteria recovered from water were inoculated into (1) 100 c.c. of sterile water; (2) 99 c.c. of sterile water to which was added 1 c.c. of a solution of sodium thiosulphate containing 1.5 gm. of crystallized salt per liter; and (3) and (4) duplicate samples of 49 c.c. each of sterile water to which were added 1 c.c. of sodium thiosulphate as above, and 50 c.c. of a solution containing residual chlorine in the amount of 2 p.p.m. Plates were made from the series of 4 samples at various times and for several series containing different numbers of organisms. (Results are shown in Table I.)

From the results obtained it would appear that little effect is exerted on the bacteria present and that probably the dechlorinated samples represent approximately the condition of the pool water at time of collection. (It is hoped that during the coming season conditions will permit the establishment of a portable laboratory at the municipal pool for actually checking this point.)

*Study 3. Occasional Checks for Free Ammonia to Control Ratio of Chlorine to Ammonia Dosage—*

*Contents—Continued*

	PAGE
Public Health Nursing— <i>Eva F. MacDongall, R.N.</i> . . . . .	76
Expenditures for Public Health Nursing Services in Minnesota. Health Department Nurses Are Behind Here. The School Nurse Again. Why Keep the Rural Nurse Rural?	
Education and Publicity— <i>Evart G. Routzahn</i> . . . . .	78
The New Chairman. Health Plays for School Use. What Happens to Them? Grand Stand Seats for a Great Campaign. Where Is It in the Report? Journalism Students Writing Up Nurses. Is Men's Clothing a Health Problem? Discussion, Discussants and Discussion Leaders. Ethics in Hospital Publicity. What Will You Do About It? How About Third Class Mail? What Is Health Education? Yes?—What's the Name? At the Foot of the First Column. Reporting. Timely Topics. Publicity Presentation. Depression.	
Books and Reports . . . . .	84
Alcohol and Man. Prohibition—A National Experiment. Principles of Chemistry. Mental Deficiency Due to Birth Injuries. Medicine and the State. Industrial Psychology. A Text-Book of Human Physiology for College Students. Pulmonary Tuberculosis. Principles and Methods of Sociology. Child Labor. Body Mechanics—Education and Practice. Environmental Factors in Negro Elementary Education. An Introduction to Practical Bacteriology. Proceedings Sixth Annual Conference, The Maryland-Delaware Water and Sewerage Association, Cumberland, Maryland, 1932.	
Books Received . . . . .	92
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . .	93
News from the Field . . . . .	95
Conferences . . . . .	96

## INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Directory of Health Service. . . . .	XXV
Book Service. .XII, XIV, XVI, XVIII, XXII, XXIV		Fuller & McClintock	
Disease Chart. . . . .	XIX	Pease Laboratories	
Employment Service . . . . .	XXVI	Evaporated Milk Association. . . . .	XIII
Health Bulletin Service. . . . .	XIV	Fleischmann's Yeast. . . . .	VII
Membership Application Form. . . . .	XXI	General Foods. . . . .	IX
Record Forms. . . . .	XXIII	Gilliland Laboratories, Inc., The. . . . .	II
Affiliated Societies. . . . .	XII	Hynson, Westcott & Dunning. . . . .	XIX
American Telephone & Telegraph Company. . . . .	V	International Equipment Co. . . . .	XVII
Canadian Public Health Journal. . . . .	XVII	Kimble Glass Company. . . . .	III
Chemical Foundation, Inc., The. . . . .	XXI	Kellogg & Company. . . . .	96
Difco Laboratories. . . . .	Back Cover	Postum. . . . .	IX
Directory of Health Service. . . . .	XXV	Squibb & Sons, E. R. . . . .	XI
American Water Works Association		Standard Brands, Inc. . . . .	VII
Bendiner & Schlesinger		Taylor Co., The Halsey W. . . . .	XXIII
Black & Veatch		Trained Nurse and Hospital Review, The	XXIII
		U. S. Standard Products. . . . .	XXVII
		University of Chicago Press. . . . .	XV
		Wallace & Tiernan Co., Inc. . . . .	XX

samples were collected twice a week from this pool, none of the portions tested for *B. coli* were positive. The pool was drained and refilled, and normal operations resulted. There is a possibility, of course, that the inspector, not realizing that the free ammonia content was so high, failed to wait long enough for the color to appear, inasmuch as the free ammonia would undoubtedly slow up the color reaction considerably.

Tests were made for free ammonia on the Municipal Fair Frounds Pool and it is interesting to note that after the pool had been operating for 3 days, after filling with clean water, the free ammonia showed, for one of the tests 0.48 p.p.m., and at another time 0.52 p.p.m. Nine days after the pool had been refilled with fresh water, the free ammonia content was 1.2 p.p.m., and 11 days after it showed 1 p.p.m. (See Table II.) This pool is one of those that was emptied every 2 weeks because of the temperature of the water. The ratio of ammonia to chlorine at this pool averaged approximately 1 to 3 for the months of July and August. Instructions were issued to all pools to dose with a 1 to 4 ratio of ammonia to chlorine for a few days after refilling and then cut to 1 to 10.

were made at the Fair Grounds Pool. This is a 1,125,000 gal., oval shaped pool with the deep water in the center, with a depth of about 3" or 4" all the way around at the outer edge and 10' in the center. The inlets are spaced about 50' apart all around and the turnover is approximately 48 hours. Several attempts to control algae by increasing the chlorine residual in the pool at night were unsuccessful due to the slow rate of recirculation and the necessary waste of water and addition of new city water in order to bring the residual back to below 1 p.p.m. within a few hours.

We quote from a paper read last year before this section regarding the effect of algal growth in using up the chlorine to the point of making it difficult to maintain a residual:

It was also observed that an increase of the use of copper sulphate up to approximately 3.5 to 4 p.p.m. applied every third day, tended to reduce the chlorine demand, presumably by more effective control of algae.

While this dose of 4 p.p.m., or about  $3\frac{1}{2}$  lb. to 100,000 gal. reduced the chlorine demand, the dose was not strong enough or the application frequent enough to prevent the growth. The dose of copper sulphate was therefore increased and the frequency of ap-

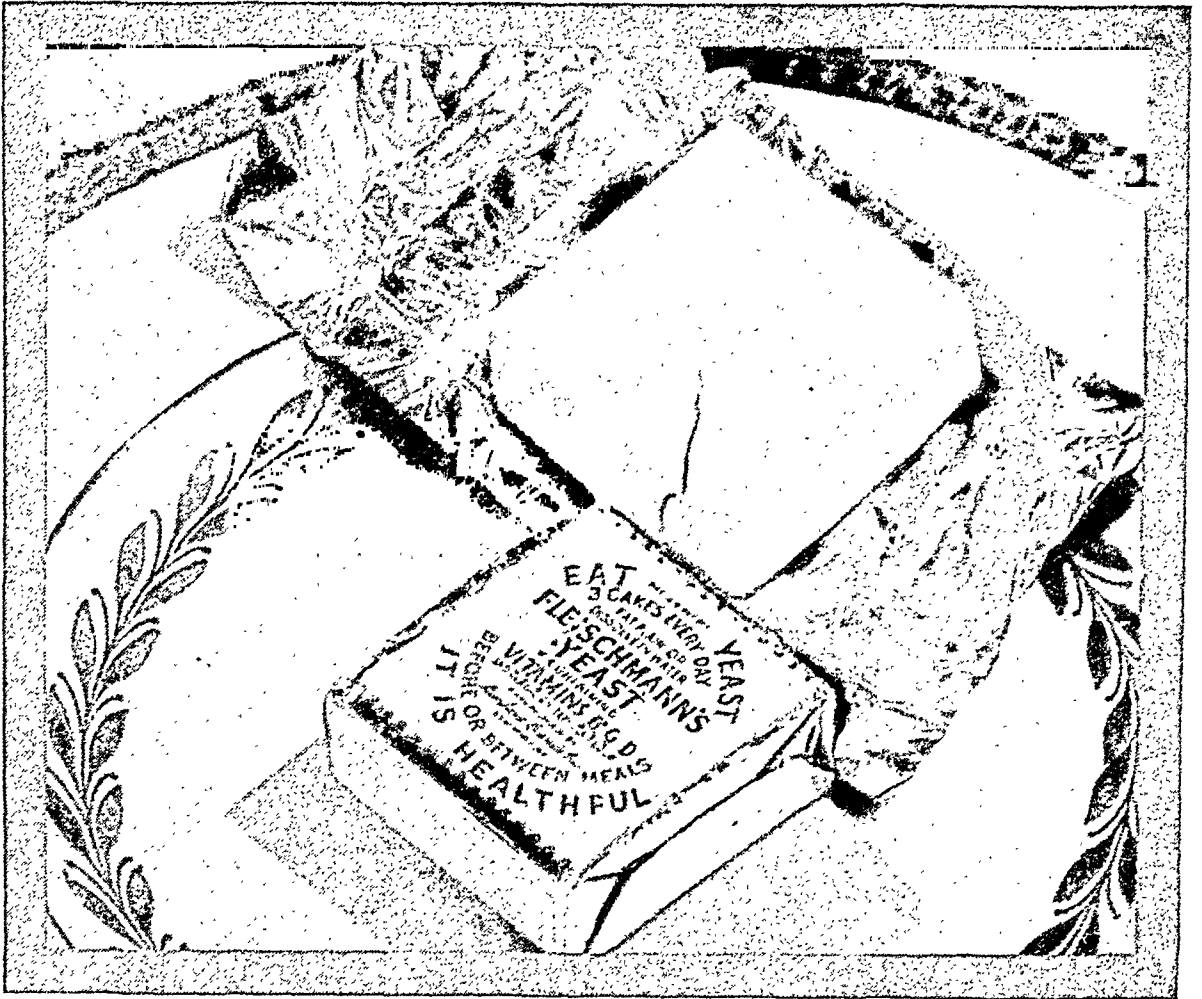
TABLE II

Pool	Date Samples Collected	Interval between Draining & Collecting	Nitrites	Free Ammonia	Albuminoid Ammonia
Fair Grounds	7- 6-33	3	0	0.48 p.p.m.	0.74 p.p.m.
1-3 ratio	7-14-33	11	0	1.00 p.p.m.	0.194 p.p.m.
Ammonia to	8- 4-33	3	Trace	0.52 p.p.m.	0.034 p.p.m.
Chlorine	8-23-33	8	0.005 p.p.m.	1.20 p.p.m.	0.034 p.p.m.
St. Agnes	7-17-33	32	1 p.p.m.	8 p.p.m.	0.05 p.p.m.

#### *Study 4. The Control of Algae With Copper Sulphate—*

The studies made on the control of slime or algae by increasing the chlorine residual of the swimming pool

plication was increased until finally the growth of the slime or algae on the bottom of the pool had been completely and definitely prevented by using a 5 lb. to 100,000 gal. dose the last thing



## Its\* importance in *Furunculosis* has been recognized for 75 years

More than three-quarters of a century ago one of the first scientific reports on the therapeutic value of yeast appeared in the columns of the London Lancet. It covered a series of cases of boils.

The treatment of furunculosis with fresh yeast is a very widely accepted practice today among dermatologists and general practitioners, and the results are such as amply to justify it. Recently, it has been shown that fresh yeast has the ability to increase very noticeably the so-called "self-disinfecting" power of the skin.

Thus the value of fresh yeast in skin disorders is due only partially to its laxative action — just as its effect in

digestive disorders is likewise due to a *combination* of nutritional and therapeutic effects.

\* Fleischmann's fresh Yeast is the only yeast containing 3 vitamins—B, G, D.

Recommend 3 cakes daily—plain or dissolved in a third of a glass of water.

### SEND FOR IMPORTANT BOOKLET

Health Research Dept. MI-1, Standard Brands Incorporated, 691 Washington St., New York City.

Please send me revised edition of "Yeast Therapy," based on the findings of distinguished investigators.

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1933, Standard Brands Incorporated

When writing to Advertisers, say you saw it in the JOURNAL

# Hemolytic Properties of the Mastitis Streptococcus\*

P. ARNE HANSEN, G. J. HUCKER, PH.D., AND  
MARION A. SNYDER

*New York State Agricultural Experiment Station, Geneva, N. Y.*

BLOOD agar plates have gained wide use in the identification of bacteria, especially in the case of streptococci. Introduced by Marmorek (1902) and later, studied more in detail by Schottmüller (1903), the use of blood agar has come to be a useful procedure in identifying streptococci. Brown (1919) described in detail the various types of colonies produced on solid blood agar and emphasized the importance of using standard procedures and a standard means of designation. He divided the various types of colonies into groups, viz., alpha, alpha prime, beta and gamma, these terms to apply only to deep colonies. The alpha type produces green coloration of the medium surrounding the colonies. Under low power magnification faint hemolysis may be noted in the outer portions of the zone. When a plate seeded with alpha hemolytic colonies is placed in the refrigerator after previous incubation of 48 hours at 37° C., an outer hemolytic zone will be noticed. The alpha prime type colony is intermediate between the alpha and the beta types. The colony is surrounded by a hemolyzed zone. This zone, however, is not clear and may, when viewed under low power magnifica-

tion, be seen to contain the red blood corpuscles in a fixed condition. The surface colony should not be used in the classification as it may be indistinguishable from the beta type.

The beta type is characterized by the surrounding halo which is perfectly clear. No red blood corpuscles may be seen in this clear zone even when examined microscopically by magnification. The gamma type is produced by organisms which do not produce hemolysis or decolorize the blood medium. Brown calls both the alpha prime and the beta type, "hemolytic," yet the former is considered more closely related to the alpha than to the beta type.

The blood agar plate has been used widely in the case of the mastitis streptococcus. By a study of the literature it may be noted that no agreement is found regarding the hemolytic powers of this streptococcus. The typical streptococcus of mastitis (*Streptococcus mastitidis*) † is as a rule described as being alpha or gamma hemolytic, but not infrequently reports are found designating it as beta hemolytic.

Gminder (1912) tested 26 udder streptococci on the blood plate prepared

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

Approved by the Director of the New York State Agricultural Experiment Station as *Journal Paper No. 8.*

† In this discussion the term *Streptococcus mastitidis* Migula will be used to designate the streptococcus associated with chronic or subclinical mastitis. The nomenclature of this organism will be subsequently determined. The use of this terminology at this time should not be construed to infer that the authors prefer this name to *Streptococcus agalactiae* Lehmann and Neumann.





*tidis* and the possible significance of this characteristic in the detection of udder infections.

#### TECHNIC

Freshly grown cultures were plated in the various media and examined after 48 hours' incubation at 37° C. The plates were then placed in the refrigerator, chilled for another 48 hours, and examined again. The media used were: (1) horse blood agar, prepared from fermented veal broth, (2) horse blood agar, prepared from plain veal broth, (3) horse blood agar, prepared from plain veal broth plus 0.05 per cent glucose, (4) sheep blood agar, prepared from plain veal broth plus 0.05 per cent glucose, (5) cow blood agar prepared from plain veal broth. The broth which constituted the basic part of all the media had the following composition:

Veal infusion from 500 g. veal....	1,000 c.c.
Bacto peptone .....	10 g.
NaCl .....	5 g.
Agar .....	15 g.
Reaction adjusted to pH 7.4	

The media were tubed in 12 c.c. lots and 0.6 c.c. of blood was added before use. The blood was always left at least 48 hours in the cold before being used for plating.

To supplement the results as secured with the blood agar plates, tests for hemolysin production were carried out in liquid media. One-half c.c. of an 18 hour culture in sugar-free broth was placed in a small test tube and 0.5 c.c. of 5 per cent washed suspension of sheep cells was added. The tubes were kept at 37° C. in a water bath and examined at regular intervals: 20 min., 1 hour, and 3 hours.

#### DISCUSSION

It is apparent (Table I) from a study of recognized strains of *S. mastitidis* that the majority are alpha hemolytic and a lesser number alpha prime, bordering on weak beta hemolysis.

Distinct and vigorous beta hemolysis was never observed, regardless of the kind of blood or the presence or absence of glucose. This observation is especially significant when it is realized that some workers report that the same strain varies in different laboratories from alpha to strong beta hemolytic.

The types beta, alpha, alpha prime, and gamma may not represent distinct types in all cases and further study is needed to decide on the mechanism of hemolysis in the weak beta hemolytic strains. Hemolysis is a complicated process depending on many factors of which not all are fully understood. The quantitative importance of these various factors has never been worked out; productions of true hemolysins, of acid and of peroxide. It is probable that the various types of hemolysis for the time being should only be considered as rough descriptions which should be confirmed by quantitative measurements.

While it may be difficult or impossible to distinguish between the various types, the difficulty, frequently described, that a certain strain varies greatly from time to time when tested on blood plates has not been encountered. Different transfers of the same strain kept for years in different culture collections under varied conditions gave identical results. Many examples of this type are found in these data (see 1 and 17, 3 and 8, 6 and 9, etc. Table I).

Brown (1919) suggested that glucose even in small amount had a marked effect on the degree of hemolysis of colonies on blood plates. That the hemolysis is somewhat suppressed by the addition of glucose becomes especially important in the case of probable intermediate types. In a medium containing glucose certain strains (No. 49) may resemble the alpha prime type while in a sugar free medium the hemolysis is so pronounced

« « **ANNOUNCING** » »

A New Edition of  
**STANDARD METHODS**  
for the Examination of  
**WATER and SEWAGE**

*Prepared under the joint auspices of the*  
**AMERICAN PUBLIC HEALTH ASSOCIATION**  
*and the*  
**AMERICAN WATER WORKS ASSOCIATION**

- This announcement is of the utmost significance to sanitarians, engineers, bacteriologists, chemists and others concerned with the establishment and maintenance of pure water supplies.
- The previous edition of Standard Methods is dated 1925. In the new edition, the Seventh, many important additions and changes occur. As examples:

The method for total hardness has been extensively revised  
The ortho-tolidine test for chlorine is presented more exactly  
The determination of the biochemical oxygen demand has been rewritten  
The use of brilliant green lactose peptone bile is allowed in conjunction with standard lactose broth for water purification plant control  
The recommended drinking water standards of the U.S.P.H.S. are included  
Twenty-three methods of analysis which are not yet recommended as standard procedures, but which may be of use, are presented in abstract and with references

- The New Edition of Standard Methods for the Examination of Water and Sewage is urgently recommended for use in water works and public health laboratories, in place of the obsolescent 1925 volume, by the American Public Health Association and the American Water Works Association. Its price is \$2.00.

*Order from*  
**The American Public Health Association**  
450 Seventh Avenue New York, N. Y.

Association News . . . . .	143
New Members. Deceased. Year Book. Southern Branch Organized.	
Public Health Administration— <i>Henry F. Vaughan, D.P.H., and Ira V. Hiscock</i> . . . . .	145
Early Diagnosis of Tuberculosis Among Children— <i>Elton G. Littell, M.D.</i>	
Health Department Reports—Tennessee. Los Angeles County, Calif. New York State.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	149
A Yeast Extract Medium for Determining the Bacterial Content of Milk by the Plate Method— <i>E. D. Devereux and J. L. Etchells.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	151
Plague in British India, 1896–1931. The Diabetes Record of 1931. Vital Statistics for Jamaica, 1931. Low Death Rates in Autumn. Population of Japan, 1920–1925.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	155
Incineration in Washington— <i>John Blake Gordon.</i>	
A Study of Zinc Content of Certain Waters— <i>R. M. Palmer.</i>	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	158
Appointment of Occupational Health Council in Massachusetts. Death of Magnus Washington Alexander. The Dust Hazard in Air-Pressure Abrasive Blasting (Sand-blasting). Physiological Factors in Mine Ventilation in 1931. Compensation for Industrial Diseases, Prague. Department of Industrial Hygiene. Facts on Child Labor. Carbon Monoxide Poisoning in Garage with Doors Open. State Requirements for Industrial Lighting.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	162
A Comparative Study of Milk in Bottles With Single and Double Caps. Numbers and Types of Organisms Found in Certain Products Used in Infant Feeding. Evidence of the Existence of a Dietary Principle Stimulating General Growth and Lactation. The Transmission of Vitamin A from Parents to Young in Mammals. The Action of Copper in Iron Metabolism. A Biochemical Study of Irradiated Milk.	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	166
United States Children's Bureau.	
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	168
Twenty Years of Red Cross Public Health Nursing. Why Not Make Use of the N.O.P.H.N.? As a Private Physician Sees Us. As the Public Sees Us.	

Continued on page viii

Reprint prices furnished upon request

# MOTHERS' MILK

## *normally* does not contain sufficient Vitamin D

SO much evidence has been adduced on this point that physicians now very generally recognize the need for a way to supplement the lack of anti-rachitic vitamin D in the diet of the nursing child.

Yet the direct administration of vitamin D to very young infants has obvious disadvantages.

It is for this reason that a means of increasing the vitamin D potency of mothers' milk itself has been sought by research workers. And preliminary tests among groups of lactating mothers now indicate that an excellent transfer of this vitamin from the diet to mothers' milk *is obtained when Fleischmann's*

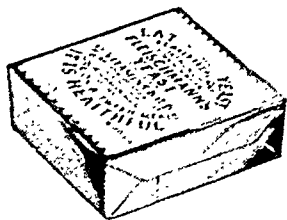
*Yeast is added to the diet.*

Every cake of Fleischmann's Yeast is now "irradiated" with ultra-violet rays. Every cake has a known vitamin D potency . . . greater than that of any other food. And in addition, it is of course extremely rich in vitamins B and G, also essential in the diet, particularly during lactation and pregnancy.

Only *Fleischmann's* fresh Yeast, you know, contains all three of these vitamins, B, G and D, together with all yeast's other natural nutritional and therapeutic elements.

Simply recommend three cakes daily—plain, or in water, milk or fruit juice.

*It is the richest food in Vitamin D...*



Health Research Dept. MI.-2, Standard Brands Incorporated,  
691 Washington Street, New York City.

Please send me a copy of the booklet, "Yeast Therapy."

Name \_\_\_\_\_

Address \_\_\_\_\_

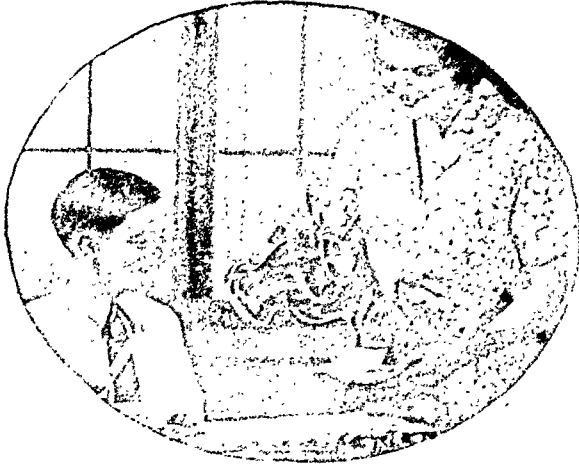
Copyright, 1933, Standard Brands Incorporated

<i>Contents—Continued</i>	PAGE
Education and Publicity— <i>Evert G. Routzahn</i> . . . . .	172
In Magazines and Books. A Publicity Council in Your City? Posters From Far and Near. What to Tell About Public Health. The "Smithson Family" in Connecticut. Low Cost Diet. Honorable Mention. Reporting. Child Health Education. Advertising. Motion Pictures. Discontinued. Radio. Educational Material. The Full Endorsement of the Advisory Council. In Your State. Magazine Articles.	
Books and Reports . . . . .	177
A Century of Public Health in Britain, 1832–1929. Medicolegal Cases. A Guide to Human Parasitology. The Canadian Mothers Book. Behind the Door of Delusion. The Sputum—Its Examination and Clinical Significance. The Purchase of Medical Care Through Fixed Periodic Payment. Normal Youth—And Its Everyday Problems. Die Arbeitsbehandlung zur Reform der Lungenheilstätten. The International Medical Annual. Environmental Factors in Negro Elementary Education. Epidemiology, Historical and Experimental. Medical Entomology. Manual of Bacteriology and Pathology for Nurses (6th ed). Magazine Publishing. Student's Handbook on Nursing Case Studies.	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . .	185
Books Received . . . . .	187
News from the Field . . . . .	188
Conferences . . . . .	190

# INDEX TO ADVERTISERS

	Page		Page
A. P. H. A.....	X	Evaporated Milk Association.....	XV
Book Service.....III, XII, XIII,		Federation of Sewage Works Associations..	XXV
XIV, XVI, XIX, XXVI		Fisher Ventilation. . . . .	IX
Disease Charts.....	XVIII	Fleischmann's Yeast. . . . .	V
Employment Service. . . . .	XXVIII	General Foods. . . . .	VII
Health Bulletin Service.....	XIV	Gilliland Laboratories, Inc., The.....	II
Membership Application Form.....	XXIV	Hynson, Westcott & Dunning.....	XXIII
Milestones of Public Health Chart....	XXII	Kellogg & Company.....	XIII
Affiliated Societies. . . . .	XII	Municipal Sanitation. . . . .	XVII
American Journal of Nursing, The.....	190	National Organization for Public Health	
Canadian Public Health Journal.....	XXIV	Nursing . . . . .	XXIII
Columbia University Press.....	190	Postum. . . . .	VII
Difco Laboratories. . . . .	Back Cover	Public Health Nursing.....	XXIII
Directory of Health Service.....	XXVII	Sewage Works Journal.....	XXV
American Water Works Association		Standard Brands, Inc.....	V
Bendiner & Schlesinger		Trained Nurse, The.....	XXV
Black & Veatch		U. S. Standard Products Co.....	XXIX
Fuller & McClintock		Wallace & Tiernan Co., Inc.....	XX
Pease Laboratories		Water Works Engineering.....	XVII
Eastman Kodak Co.....	XXI		
Eimer & Amend.....	XXIII		

# Without these facts, you wouldn't believe this



## Thousands of children all over America drink coffee daily!

**I**N SPITE of the years of educational work carried on by physicians, public health officials and such societies as the American Child Health Association, surveys show that an alarming number of school children are given coffee each day.

### *Over 50% Drink Coffee*

For example, a recent survey in and around Pittsburgh shows that 56.6% (1,264 out of 2,231) of the children of school age drink coffee. In San Francisco out of 15,000 grammar school children over half that number were found to drink coffee.

Another survey, conducted among 80,000 school children by a world famous Research Institution shows that youngsters who drink coffee stand far less chance of good grades than those who don't. And even if other causes, besides the caffeine habit, contributed to their backwardness, the fact remains that coffee drinking children are not as good at their studies as those who do not drink it.

### *Coffee Robs Children of Milk*

Furthermore the Research Institution found

that coffee drinking is frequently a cause of malnutrition—children who drink coffee are apt to drink too little milk.

Thousands of fathers and mothers have become so used to coffee that they have failed to realize the harm it can do to their children. Many parents make the excuse—"My children need a hot drink in the morning." Of course they do. But why one that tears down? Why not one that builds up? For instance—Postum made with hot milk. It contains no drug—no artificial stimulant.

### *A Hot Drink Children Love*

Only the most wholesome ingredients are used in making Postum—just whole wheat and bran roasted to a turn and slightly sweetened. Postum-made-with-hot-milk combines all the nourishing qualities of milk with the wholesomeness of Postum. Even children who do not like milk alone, find Postum-made-with-milk delicious. What a contrast to coffee! What a difference to the child. Postum is a product of General Foods.



THESE FACTS are printed in the belief that they will interest you and in the hope that you will give your cooperation to this campaign to abolish the coffee drinking habit among school children.

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

March, 1933

Number 3

### CONTENTS

	PAGE
Mental Hygiene Symposium	
Mental Health of the Preschool Child . . . . .	191
<i>Ira S. Wile, M.D.</i>	
Are the "Nerves" and Badness of Childhood of Any Importance to the Field of Public Health? . . . . .	198
<i>Esther L. Richards, M.D.</i>	
Mental Hygiene of Adolescence . . . . .	206
<i>William A. White, M.D.</i>	
Discussion of above three papers— <i>Clarence M. Hincks, M.D.</i> . .	209
The Aim and Accomplishments of a Health Center Mental Hygiene Program	211
<i>Elizabeth I. Adamson, M.D.</i>	
Effects of Air Contaminants on the Natural Light of Cities . . . . .	217
<i>H. B. Meller and Mary E. Warga</i>	
Antirachitic Activation of Milk by Direct Irradiation With Ultra-violet Rays	225
<i>G. C. Supplee, Ph.D.</i>	
Production of Antirachitic Milk by the Feeding of Dairy Cattle . . . . .	230
<i>J. G. Hardenbergh, V.M.D., and L. T. Wilson, Ph.D.</i>	
Relationships of Leucocytes and Streptococci to Fibrosis of the Udder . . .	237
<i>G. J. Hucker, Ph.D.</i>	

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States, Canada, Cuba, and Mexico and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

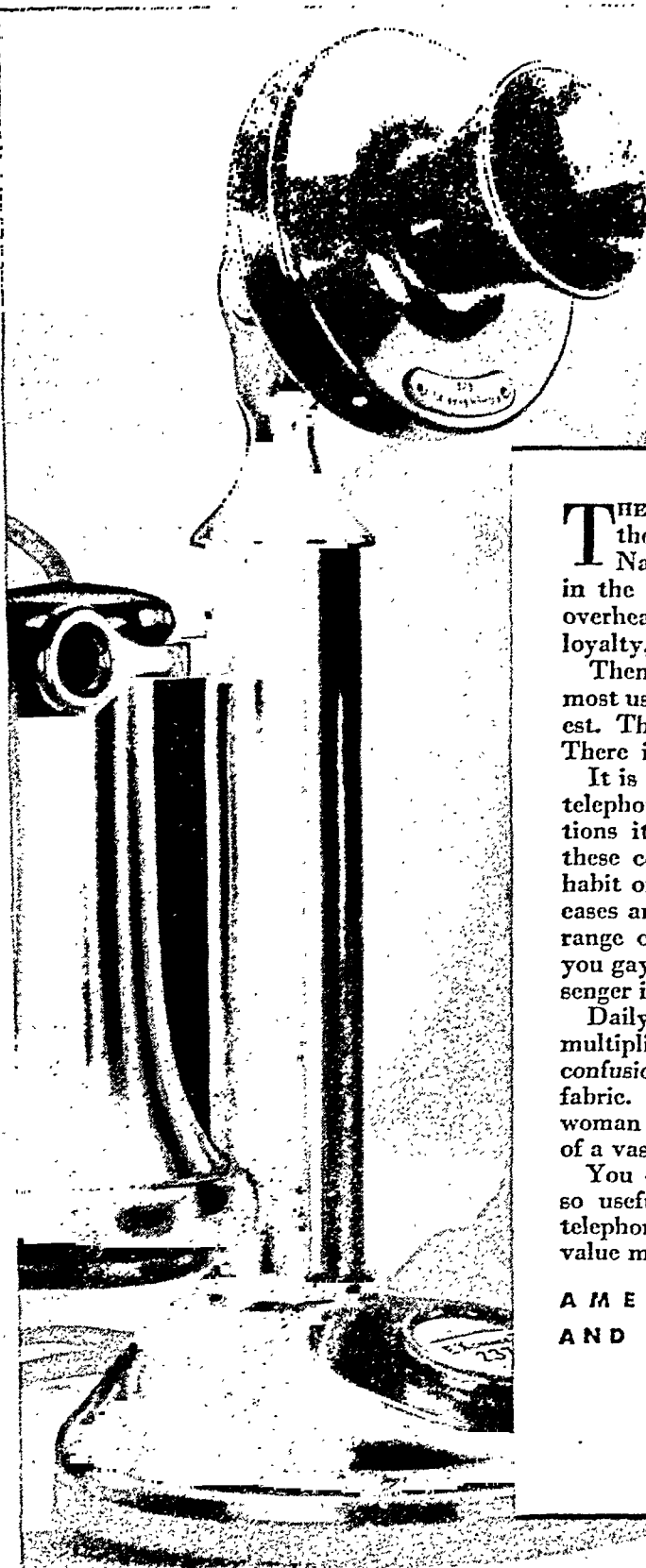
Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Application for change of entry as second-class matter from Lancaster, Pa., to Albany, N. Y., pending.



# WITHIN THE REACH OF MILLIONS



**T**HE most valuable things on earth are the commonest things. Gifts of Mother Nature—air, rain, sunlight and colors in the sky, grass underfoot and foliage overhead. Gifts of human nature—love, loyalty, handclasps and friendly speech.

Then, of material things, some of the most useful are the commonest and cheapest. These we take almost for granted. There is no way to reckon their worth.

It is a great tribute to the value of the telephone that within a few short generations it has come to be ranked among these common things. Its daily use is a habit of millions of people. It speeds and eases and simplifies living. It extends the range of your own personality. It offers you gayety, solace, security—a swift messenger in time of need.

Daily it saves untold expense and waste, multiplies earning power, sweeps away confusion. Binds together the human fabric. Helps the individual man and woman to triumph over the complexities of a vast world.

You cannot reckon fully the worth of so useful and universal a thing as the telephone. You can only know that its value may be infinite.

**AMERICAN TELEPHONE  
AND TELEGRAPH COMPANY**



## EDITORIAL SECTION

Your Association . . . . .	246
The Depression and Health . . . . .	247
Letter from Great Britain— <i>Charles Porter, M.D.</i> . . . .	249
Association News . . . . .	252
Rural Health Appraisals. New Members. Dr. Bolt Receives Oberlaender Award.	
Public Health Administration— <i>Henry F. Vaughan, D.P.H., and Ira V. Hiscock</i> . . . . .	254
India. Attleboro, Mass. Montreal, Quebec. Bernalillo County, N. M. Brantford, Ontario. United States Public Health Service. Providence, R. I. Public Health Organization in Indiana. U. S. Children's Bureau.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . .	259
Titration of the Neutralizing Potency of Anti-meningococcus Serum by the Phenomenon of Local Skin Reactivity— <i>Grace M. Sickles</i>	
Some Variants of <i>Bacillus Megatherium</i> — <i>Georges Knaysi, Ph.D.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . .	261
Vital Statistics for Rhode Island, 1932. Birth Rates and Fecundity in Italy. Mortality in the Industrial Population, 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . .	266
Shellfish Treatment Plant at Newburyport, Mass.— <i>Edward Wright</i>	
The Oxidation Potential Concept of Chlorination— <i>F. C. Schmelkes</i>	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . .	270
Division of Occupational Diseases, Connecticut, Annual Report, 1931. Employed Boys and Girls in Milwaukee. Division of Industrial Hygiene, Ontario Department of Health, 1931. Cautionary Notices. The Equivalent Temperature of a Room and Its Measurement. Cyanide Poisoning in San Francisco. "Pneumoconiosis." "Occupation and Health." Alternating Current Precipitators for Sanitary Air Analysis. Toxicity of Dichlorotetrafluoroethane. Protection Against Mercury Vapor Afforded by Cannister Gas Masks.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	274
Soft Curd Milk. The Antirachitic Potency of Eggs from Hens Receiving Massive Doses of Activated Ergosterol. Studies on Vitamin G ( $B_2$ ) With Special Reference to Protein Intake. Vitamin C Content of Frozen Orange Juice. The Nutritive Value and Efficiency of Mineralized Milk. Pasteurization of Milk Artificially Infected With Two Strains of <i>Brucella Suis</i> .	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . .	278
Parental Education and Child Hygiene.	
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . .	281
Public Health Nurses Take Stock. Health Integration in High School. An Adequate Community Nursing Service.	

Continued on page viii

Reprint prices furnished upon request



# Recommend it\* in cases of *Constipation, Stomach and Skin Disorders*

**F**LEISCHMANN'S YEAST is of very decided value in treating disorders which the physician has to deal with every day.

The reason Fleischmann's Yeast is so desirable in cases of constipation is that it gently stimulates peristalsis without forming a dangerous habit.

In digestive disorders, it stimulates gastric secretions and supplies vitamins B and G, so important in relation to the appetite, as well as vitamin D.

In furunculosis, acne and other common suppurative skin disorders, Fleischmann's Yeast has a very well-known effect. It has now been discovered that it has the peculiar ability actually to increase the skin's

so-called "self-disinfecting" power.

\*Fleischmann's fresh Yeast is the only yeast that is rich in *three* vitamins. Advise just three cakes daily—one before each meal, or between meals and at bedtime. It may be eaten either plain, broken up in small pieces, or dissolved in water (preferably about a third of a glassful).



**SEND FOR  
IMPORTANT BOOKLET**

Health Research Dept. M1-3, Standard Brands Inc.  
691 Washington Street, New York City.

Please send me revised edition of "Yeast Therapy,"  
based on the findings of distinguished investigators.

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1928, Standard Brands Incorporated

When writing to Advertisers, say you saw it in the JOURNAL

*Contents—Continued*

	PAGE
Education and Publicity— <i>Evert G. Routzahn</i> . . . . .	285
A Correction. Survey of Health Education. The Volunteer Worker. Health Education in the Philippines. Read "The Health Talk" If You Talk About Health. Fewer Words Will do the Job. The Discussion Leader. Public Health in "Literary Digest." One Hundred New Names. Radio. Coöperating Groups. New. Honorable Mention. House Organs. Corrections and Amplifications. Health Education in Boston.	
Books and Reports . . . . .	289
Men Against Death. The Sanitation of Water Supplies. Streptococci in Relation to Man in Health and Disease. The Youngest of the Family, His Care and Training. Syllabus of Medical History. pH and Its Practical Applications: A New Handbook and Reference Work. Bacteriology for Nurses. Bacteriology for Nurses, with a Laboratory Manual. The Expectant Mother's Handbook. Applied Bacteriology. Publications of the National Quarantine Service, Republic of China—Series I. Medical Care for the American People—Final Report of the Committee on the Costs of Medical Care. Fads and Quackery in Healing. History of Chinese Medicine. The Curative Value of Light. Teaching Nutrition to Boys and Girls.	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	299
Books Received . . . . .	301
News from the Field . . . . .	302
Conferences . . . . .	303

## INDEX TO ADVERTISERS

	Page.		Page
A. P. H. A. . . . .	X	Fleischmann's Yeast. . . . .	V
Book Service. . . . .	XII, XIV, XVI, XVIII, XXII, XXIV	General Foods. . . . .	XIII
Disease Charts. . . . .	XXVII	General Laboratories. . . . .	XXV
Employment Service. . . . .	304	Gilliland Laboratories, Inc., The. . . . .	II
Health Bulletin Service. . . . .	XIV, XVIII	Hynson, Westcott & Dunning. . . . .	XXVI
Membership Application Form. . . . .	XXVI	International Equipment Company. . . . .	XXIII
Affiliated Societies. . . . .	XII	Kellogg & Company. . . . .	IX
American Journal of Cancer, The. . . . .	304	Kimble Glass Company. . . . .	XI
American Journal of Nursing, The. . . . .	304	Municipal Sanitation. . . . .	XXI
American Telephone & Telegraph Company. . . . .	III	National Organization for Public Health Nursing. . . . .	XXIII
Canadian Public Health Journal. . . . .	XXVII	Postum. . . . .	XIII
Difco Laboratories. . . . .	Back Cover	Public Health Nursing. . . . .	XXIII
Directory of Health Service. . . . .	XXVIII	Public Works. . . . .	XVII
American Water Works Association		Squibb & Sons, E. R. . . . .	XV
Bendiner & Schlesinger		Standard Brands, Inc. . . . .	V
Black & Veatch		Trained Nurse, The. . . . .	XXV
Fuller & McClintock		U. S. Standard Products Co. . . . .	XXIX
Committee on Administrative Practice, A.P.H.A.		Wallace & Tiernan Co., Inc. . . . .	XX
Evaporated Milk Association. . . . .	XIX	Water Works Engineering. . . . .	XXI

# Is It Advertised

*in the*

## AMERICAN JOURNAL of PUBLIC HEALTH?

"Has the American Public Health Association ever accepted for advertising in the Journal such and such an article or product?" is a question frequently asked, the assumption being that products, equipment and services advertised in the American Journal of Public Health are safe to buy, prescribe, specify or recommend.

The assumption often is that aids to health protection and promotion not appearing in the Journal are not worthy of professional support.

Health authorities appreciate that manufacturers and distributors marketing the things used in modern health work have helped immeasurably in disease prevention and health building. Not all such things are advertised in the Journal, but health workers are right in using its advertising pages as their first guide. When the answer to the question "Is it advertised in the Journal?" is "Yes," then that advertiser should be patronized. It is only fair that readers should give preference in their buying to the advertisers who are supporting their magazine.

It is fair, too, to let Journal advertisers know that their announcements are read, and that they influence readers to buy.

It is not safe to neglect the advertising pages of the Journal. New products of public health significance are being developed constantly, many of them evolving as the commercial applications of scientific discoveries made by members of this Association.

The urgent recommendation is made that the advertising pages be scanned with care month by month, and that the advertisers be made aware of the interest of readers in correspondence and in patronage.

This practice can result in nothing but good for the public health worker, the advertiser and the Journal.

The American Public Health Association  
450 Seventh Avenue New York, N. Y.

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

April, 1933

Number 4

## CONTENTS

	PAGE
Recognition and Control of Tuberculosis of Childhood . . . . .	305
<i>Eugene L. Opie, M.D.</i>	
Public Health Ten Star Final Special Session	
Tuberculosis of Bovine Origin . . . . .	316
<i>Mazÿck P. Ravenel, M.D.</i>	
Activities and Trends in the Laboratory Field . . . . .	318
<i>George W. McCoy, M.D.</i>	
Current Preoccupations of Health Officers . . . . .	323
<i>Huntington Williams, M.D., Dr.P.H.</i>	
Work in Vital Statistics for Public Health . . . . .	326
<i>Walter F. Willcox, Ph.D.</i>	
The Public Health Engineer's Work . . . . .	329
<i>Abel Wolman</i>	
Industrial Hygiene . . . . .	332
<i>Alice Hamilton, M.D.</i>	
Food and Health . . . . .	335
<i>Henry C. Sherman</i>	
Health Education . . . . .	337
<i>Iago Galdston, M.D.</i>	
Trends in Public Health Nursing . . . . .	339
<i>Helen C. LaMalle, R.N.</i>	

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.



## Scolded for C's *that really stand for coffee!*

IT is hard to believe—that in many sections of this country over half the children of grade and high-school age drink coffee daily. Yet extensive surveys show this to be true. And also—that children who drink coffee are less efficient in their studies than those who do not drink it.

Thousands of parents have become so used to coffee that they have failed to realize the harm it can do when given to their children.

When you encounter such cases, isn't Postum made with milk an excellent suggestion? Isn't it an ideal hot drink for children? It is not a drink that tears down, but a drink that builds up. Wholesome, nourishing—it contains no caffeine, no artificial stimulant.

Postum is simply whole wheat and bran,

roasted and slightly sweetened. And Postum made with milk is not only a nourishing drink, but a drink children love—even children who turn up their noses at plain milk.

Postum costs less than  $\frac{1}{2}\text{¢}$  a cup. It comes in two forms—Instant Postum, made instantly in the cup, and Postum Cereal, the kind you boil. Postum is a product of General Foods.

*If you will write us we will be glad to send you a special gift package containing a full-size package of Instant Postum, together with samples of Grape-Nuts, Grape-Nuts Flakes, Post Toasties, Post's Whole Bran, and Post's Bran Flakes. General Foods, Dept. P V-433, Battle Creek, Michigan. If you live in Canada, address General Foods, Ltd., Dept. P V-433, Cobourg, Ontario.*



	PAGE
Current Work of the Section on Epidemiology . . . . .	341
<i>Haven Emerson, M.D.</i>	
Suggested Procedures for the Presumptive Test in the Determination of the Coli-Aerogenes Group . . . . .	343
<i>C. T. Butterfield</i>	

## EDITORIAL SECTION

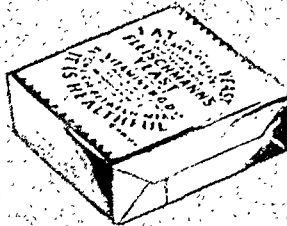
Radium Poisoning . . . . .	350
Vaccination Against Smallpox—or Not? . . . . .	351
A New Journal (The Health Officers' World) . . . . .	352
Association News . . . . .	353
<i>New Members.</i>	
Public Health Administration— <i>Henry F. Vaughan, D.P.H., and Ira V. Hiscock</i> . . . . .	354
<i>Commonwealth Fund. Diphtheria Prevention Programs. New Jersey. New Zealand. School Health Service. Middletown, Ohio. Lincoln, Neb.</i>	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	359
<i>Proposed Changes in the New (Sixth) Edition of the Standard Methods of Milk Analysis—Robert S. Breed, Ph.D.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	360
<i>Health Conditions in New York State, 1932. Birth and Death Experience in Illinois, 1932. Preliminary Report on Marriage and Divorce for Rhode Island, 1932. Diphtheria Prevalence and Control in the Countries of Southern Europe. Connecticut Motor Vehicle Statistics for 1932.</i>	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	364
<i>Dewatering and Incineration of Sewage Sludge Under Test at Chicago. High- Lights of Sewage Treatment in Europe. New Water Works for a South American City. A Decade of Municipal Work and Improvement in Gibraltar. Link-Belt Aerator-Mixer. New Water Treatment Plant—Installation at Baddesley Collieries. Sterilizing Mains and Contaminated Pipe. Milk Control Schools—W. Scott Johnson.</i>	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Green- burg, M.D., Ph.D.</i> . . . . .	368
<i>Industrial Disease Commission Starts Job. "Occupational Diseases." Occupa- tional Disease and Compensation. Silico-Anthraxis. Cleanliness in Industry. The Employment of Women in Vitreous Enameling. Occupational Diseases in Germany. Patologia da Solventi e Misure Igieniche e Profilattiche (Relazione). The Control of Discharged Gases and Fumes from Ventilating Systems. New York Governor's Health Commission Industrial Recommendations. The Medical Aspects of Industrial Accidents. Medical Service in a Chemical Industry. Silicosis in the Foundry. Silicosis. Pneumoconiosis. Soda and Its Compounds. Chrome Poisoning Outbreak. The Health of Chromium Plating Workers. Workmen's Compensation in Pulmonary Disease.</i>	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	375
<i>Cobalt in Animal Nutrition. The Effect of the Prolonged Feeding of a Milk- Iron-Copper Diet to Rats. A Note on the Calcium Content of Cabbage. Mussel and Clam Poisoning. Increasing the Vitamin D Content of Milk—II. The Effect of Feeding Cows a Cod-Liver Oil Concentrate (Vitex).</i>	

*Continued on page viii*

*Reprint prices furnished upon request*



# Preliminary tests show it\* gives the best *transfer of Vitamin D* *to Mothers' Milk*



**F**LEISCHMANN'S YEAST has a very important new usefulness as a result of its richness in vitamin D.

It is now widely known by physicians that mothers' milk normally does not contain vitamin D in sufficient quantities. As a result, it is necessary to supplement the nursing child's diet with a direct administration of this vitamin.

To this, however, there are in the case of very young infants obvious disadvantages.

Tests now show that the vitamin D potency of mothers' milk itself can be increased. Preliminary results from a series of tests with lactating mothers indicate that this transfer of vitamin D from the diet to mothers' milk *is best accomplished with Fleischmann's Yeast.*

Every cake of Fleischmann's Yeast is now "irradiated" with ultra-

violet rays. Every cake has a known vitamin D potency . . . greater than that of any other food. And in addition it is, of course, extremely rich in vitamins B and G, also essential in the diet particularly during lactation and pregnancy.

\*Only *Fleischmann's* fresh Yeast contains all three of these vitamins, together with the other well-known nutritional and therapeutic elements of fresh yeast.

Simply recommend three cakes daily — either plain, or dissolved in water, milk or fruit juice.

Health Research Dept. MY-4, Standard Brands Inc.  
691 Washington Street, New York City

Please send me a copy of the booklet,  
"Yeast Therapy."

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1933, Standard Brands Incorporated

<i>Contents—Continued</i>		PAGE
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .		377
Milk for Children in the Emergency.		
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .		379
Our Rôle in Communicable Disease Control. The Summer Round Up Is a Great Opportunity for Public Health Nurses. School Nurses Can Use This.		
Education and Publicity— <i>Evert G. Routzahn</i> . . . . .		381
Both Right and Wrong. Child Health Education Memoranda. Public Health Education. Wide Representation at Health Education Institute. Two Special "Baby" Editions. Dates Ahead. Depression. Educational Material. Diphtheria. Motion Pictures. Reporting. Schools and Children. Rural Work. These Have Been Broadcast. Criticism.		
Books and Reports . . . . .		389
Life Begins at Forty. Social Hygiene in Schools. Community Health Organization. Outwitting Our Nerves, 2d ed. The Sciences of Man in the Making: An Orientation Book. Housing and the Community—Home Repair and Remodeling. Your Teeth and Their Care. Health Education Activities. Cultivating the Child's Appetite, 2d ed. Reports, National Quarantine Service (China)—Series II, 1931. The History of Dermatology. The Diagnosis and Treatment of Postural Defects. Manual of Microbiology. Public Health and the Private Medical Practitioner. Benzol (Benzene) Poisoning, 2d ed. Ethics in Nursing. Slums, Large-Scale Housing and Decentralization. Principles of Mental Development: A Textbook in Educational Psychology. New Jersey's Agricultural Experiment Station, 1880-1930. Our Wonderland of Bureaucracy. The Fundamentals of Personal Hygiene. Water Analysis for Sanitary and Technical Purposes, 2d ed. Your Teeth: Their Care and Preservation.		
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . . .		402
Books Received . . . . .		403
News from the Field . . . . .		404
Conferences . . . . .		406

## INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. ....	X	Eastman Kodak Company.....	XXI
Book Service.....XII, XIV, XV, XVI, XX, XXV		Eimer & Amend, Inc.....	XXIII
Disease Charts . . . . .	XVII	Fleischmann's Yeast . . . . .	V
Employment Service . . . . .	XXII	General Foods . . . . .	III
Health Bulletin Service.....	XIV, XVI	General Laboratories, Inc.....	XIII
Membership Application Form.....	XXIII	Gilliland Laboratories, Inc., The.....	II
Affiliated Societies . . . . .	XII	Harper & Brothers.....	VII
American Journal of Cancer, The.....	XI	Hynson, Westcott & Dunning.....	XI
American Journal of Nursing, The.....	XIX	Kellogg & Company.....	XIX
Canadian Public Health Journal.....	XVII	National Organization for Public Health	
Difco Laboratories . . . . .	Back Cover	Nursing . . . . .	IX
Directory of Health Service.....	XXIV	Postum . . . . .	III
American Water Works Association		Public Health Nursing.....	IX
Bendiner & Schlesinger		Standard Brands, Inc.....	V
Black & Veatch		Trained Nurse, The.....	XIII
Fuller & McClintock		Wallace & Tiernan Co., Inc.....	XXIII
Pease Laboratories, Inc.			

"... will help toward an understanding of the social medical problem! Admirable and rich in information!"—James P. Warbasse, M.D., in *The Survey*.

# HOW TO BUDGET HEALTH

By EVANS CLARK

Director, Twentieth Century Fund

What can we do to assure adequate medical care for everyone at moderate cost? Must the burden of this cost on communities, philanthropy and hospitals continue to grow indefinitely? This book provides helpful answers to these questions. It offers a constructive plan of medical guilds for doctors and patients, to answer the demand of public health officials, hospitals and local communities for adequate medical care at a reasonable and predetermined cost.

The book is at once a practical working manual on the functioning of medical guilds and a reference work presenting a vast array of facts on the entire problem of medical care from the economic point of view. Detailed and authoritative, it will be of the greatest assistance to everyone interested in solving this most pressing problem of adequate medical care at moderate cost. To get the book for FREE EXAMINATION, use the coupon. Price \$4.00.

## Enthusiastic Endorsement!

"A timely, interesting, practical sequel to the recent report of the Committee on the Costs of Medical Care. A contribution of much interest."  
—*New York Times*

"Conservative and excellently conceived. Marks a much more important milestone in the great problem of medical economics than I thought could be obtained."  
—Dean M. C. Winternitz, School of Medicine, Yale University

"From the standpoint of the Committee on the Costs of Medical Care, I am delighted to have it come out at present. One of the most fundamental and important contributions ever made on the subject."  
—Dr. C.-E. A. Winslow, School of Medicine, Yale University

"An important contribution."  
—Dr. Haven Emerson

## The Contents

### Preface

- I. The Medical Guild Plan
- II. The Medical Service "Industry"
- III. Paths of Progress—Group Practice
- IV. Paths of Progress—Group Payment
- V. Paths of Progress—Periodic Examinations
- VI. Approaches to the Guild Plan
- VII. The Legality of Medical Guilds
- VIII. Problems of Guild Membership
- IX. Guild Services
- X. Problems of Guild Organization
- XI. Guild Finance
- XII. Attitude of the Profession
- XIII. Attitude of the Public
- XIV. Summary and Conclusions

## Free Examination!

HARPER & BROTHERS,  
49 East 33rd St., New York  
Please send me one copy of

HOW TO BUDGET HEALTH—\$4.00

☐ I agree to remit \$4.00 within ten days or to return the book.

☐ Remittance enclosed. ☐ Send C.O.D.

Name .....

Street .....

City & State .....

Business Connection .....  
PH 5 (Please fill in)

HARPER & BROTHERS : PUBLISHERS : NEW YORK

When writing to Advertisers, say you saw it in the JOURNAL

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

May, 1933

Number 5

### CONTENTS

	PAGE
Application of the Principles of Water Purification to the Control of Swimming Pools . . . . . <i>A. H. Fletcher and A. E. Clark</i>	407
Risk of Persons in Familial Contact with Pulmonary Tuberculosis . . . . <i>W. H. Frost, M.D.</i>	426
Medical Examination of Domestic Servants . . . . . <i>Charles V. Craster, M.D., D.P.H.</i>	433
Sunlight and Health . . . . . <i>Haven Emerson, M.D.</i>	437
Health Problems Peculiar to the Southern States . . . . . <i>John A. Ferrell, M.D., Dr.P.H.</i>	441
Industry in Medicine . . . . . <i>C.-E. A. Winslow, Dr.P.H.</i>	450
Suggested Method of Computing and Standardizing the Maternal Mortality Rate . . . . . <i>Robert J. Lowrie, M.D.</i>	459
Present Status of Handling Water Samples . . . . . <i>Elfreda L. Caldwell and Leland W. Parr, Ph.D.</i>	467
Record Forms for Public Health Nursing . . . . . <i>Report of the Records Committee, N.O.P.H.N.</i> <i>Louise M. Tattershall, Secty.</i>	473

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

# "I'll call you up!"



A HUSBAND bids his wife good-bye as he leaves in the morning. "I'll call you up," he says reassuringly. A guest leaves after a pleasant week-end. "I'll call you up," she tells her hostess. An executive sits at his desk handling varied business matters, large and small. "I'll call you up," he says.

"I'll call you up" is a phrase that has become part of our language and part of our modern security. It is a phrase of confidence and a phrase of friendship. Implied in it is a nearness to everything and everybody.

The familiar gesture of lifting the telephone receiver holds boundless possibilities. It may avert a danger, end an anxiety, insure an order. Or it may be for some trivial pleasant purpose—a jest to be shared, a greeting to be spoken.

Over the telephone speed the thoughts that change destiny, bring new hope to the wondering and greater achievement to the ambitious. Think what this world would be like if you could not telephone so easily to so many people. No one is far away when you can say—"I'll call you up."

AMERICAN TELEPHONE AND TELEGRAPH COMPANY



# EDITORIAL SECTION

	PAGE
Does Heating Injure the Nutritive Properties of Milk? . . . . .	476
Common Sense in Health Propaganda . . . . .	478
Defeat of Pasteurization in Manchester, England . . . . .	479
Indianapolis: A.P.H.A. Convention City for 1933 . . . . .	481
Letter from Great Britain— <i>Charles Porter, M.D.</i> . . . .	484
Association News . . . . .	487
New Members.	
Public Health Administration— <i>Henry F. Vaughan, D.P.H., and Ira V. Hiscock</i> . . . . .	488
Health Department Reports: Colorado Springs. Palama Settlement, Honolulu. Palo Alto, Calif. Pasadena, Calif. Detroit, Mich. New Mexico. Illinois. Steubenville, Ohio.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . .	493
Whooping Cough Plates in a Public Health Laboratory— <i>Edmund K. Kline, Dr.P.H.</i>	
Standardization of the Complement-Fixation Test for Syphilis— <i>Ruth Gilbert, M.D.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . .	500
The Census of 1930 and the Growth of Population in Finland During the Last Decade. Statistics on Tuberculosis. Industrial States Decline Most in Births. Vital Statistics for Pennsylvania in 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . .	505
Protecting Bathing Facilities by Use of an Ammo-Chlorine Boat. Conformity of Public Water Supplies to the U. S. Treasury Department Standards. Colon-Aerogenes Types of Bacteria as Criteria of Fecal Pollution. The Use of Bleaching Clay in Water Purification. Why a Seasonal Quarantine Is Placed Upon Mussels and Clams. New Paris. The Water Supply and Sanitation of Paris and District. Cotton Guard Rope in Swimming Pools as Source of Colon-Aerogenes Group. A New Nutrient Medium for the Isolation of B. Coli.	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . .	509
Lead Poisoning, New York State, 1931. Silicosis—The Hazard, What It Is, And How It May Be Prevented. Silicosis in Great Britain. Occupational Disease, New York State, 1932. The Position of the Medical Officer of Health in Relation to Industrial Hygiene. Frequency of Pneumonia Among Iron and Steel Workers. Annual Report, Institute for Science of Labour, 1930-1931 (Japan). Occupational Diseases in Czechoslovakia. Sickness Among Male Industrial Employees During the Final Quarter of 1932. Pottery.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	512
Vitamin D and the Conservation of Calcium in the Adult. Antimony Poisoning Due to the Use of Enamelled Vessels. Relation of Vitamin A to Cancer. The Antiscorbutic Value of Fresh Lime Juice. Vitamin C and the Suprarenal Cortex—I. Antiscorbutic Activity of Ox Suprarenal. Vitamin A Content of Naturally Colored Nut Margarines.	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . .	516
School Health Program for the Virgin Islands of the United States— <i>Sally Lucas Jean.</i>	
Child Health in Mining Camp and Village.	

Continued on page viii

Reprint prices furnished upon request



# For “run-down” condition recommend 3 cakes a day

**W**HEN patients feel “all run down”—with no definite, localized symptoms—the physician knows that digestive disorder is all too frequently the underlying cause.

In cases involving faulty elimination, with loss of appetite, constipation, digestive and skin disorders, the therapeutic value of fresh yeast has been proved time and again.

Fleischmann's Yeast, as you know, is not habit-forming. Its effect on the intestines is gentle rather than drastic. And it has certain very high nutritional values as well.

For example, Fleischmann's Yeast is now the richest of all foods in vitamin D. It is also very rich in vitamins B and G, so important

in restoring the appetite and aiding the digestive process.

Simply recommend 3 cakes daily—before meals, or between meals and at bedtime. It can be eaten just plain, in small pieces, or dissolved in a third of a glass of water. Since Fleischmann's fresh Yeast is the only kind that contains three vitamins, it should always be specified by name.

## SEND FOR IMPORTANT BOOKLET

Health Research Dept. MI-5, Standard Brands Inc.  
691 Washington Street, New York City.

Please send me a copy of the booklet,  
“Yeast Therapy.”

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1933, Standard Brands Incorporated

Contents—Continued

	PAGE
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	519
Behavior Aspects of Nursing Education. Miss Wald and Henry Street Settlement Have Birthdays.	
Education and Publicity— <i>Evart G. Routzahn</i> . . . . .	523
Motion Picture Memoranda. Publicity First Aid for Nursing Groups. Explaining Emergency Diets. Some Instruments of Public Information. "On the Air." Another Health Education Institute. Teaching of Health. Geography of the Health Education Institute. "The County Fair Is Next Week." Health Education in Boston. Meeting Depression. New or Different. Training. Dates Ahead. Reporting.	
Books and Reports . . . . .	529
Report of the Water Resources Commission of Maryland to the General Assembly of Maryland. Report of the Medical Research Council for the Year 1931-1932. 100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics. Health Stories, Book One. The Fine Art of Living. Popular Science Talks. Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis. Correction of Defective Speech. Poliomyelitis: Survey by The International Committee for the Study of Infantile Paralysis. Nutrition Service in the Field—Child Health Centers: A Survey. Endocrine Medicine. International Health Year-Book, 1930, Vol. VI. Cancer Then and Now. Your Hearing: How to Preserve and Aid It. Hookworm Infection. How to Budget Health. Books for Tired Eyes (2d ed.).	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	538
Books Received . . . . .	540
News from the Field . . . . .	541
Summer School Courses in Public Health.	
Conferences . . . . .	546

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Directory of Health Service. . . . .	XXV
Book Service. . . . .XII, XIII, XIV,		American Water Works Association	
XV, XVI, XVIII, XXII		Bendiner & Schlesinger	
Disease Chart. . . . .	XXIII	Black & Veatch	
Employment Service. . . . .	XXVI	Committee on Administrative Prac-	
Health Bulletin Service. . . . .	XVIII	tice, A.P.H.A.	
Membership Application Form. . . . .	XVII	Record Forms, Remington Rand, Inc.	V
Milestones of Public Health Chart. . . .	XXIV	Fleischmann's Yeast. . . . .	IX
Affiliated Societies. . . . .	XII	General Foods. . . . .	II
American Journal of Cancer, The. . . . .	XIX	Gilliland Laboratories, Inc., The. . . . .	XIV
American Journal of Health and Physical		Hynson, Westcott & Dunning. . . . .	XVII
Education. . . . .	XXII	International Equipment Company. . . . .	XXI
American Journal of Nursing, The. . . . .	XXII	Johns Hopkins University, The. . . . .	XXVII
American Telephone & Telegraph Com-		Kellogg & Company. . . . .	VII
pany. . . . .	III	Kimble Glass Company. . . . .	XIX
Canadian Public Health Journal. . . . .	XXIII	Mead & Wheeler Co. . . . .	IX
Difco Laboratories. . . . .	Back Cover	Postum. . . . .	XI
		Squibb & Sons, E. R. . . . .	V
		Standard Brands, Inc. . . . .	XXI
		Trained Nurse, The. . . . .	XX
		Wallace & Tiernan Co., Inc. . . . .	





## Graduated Glassware that is retempered like fine steel . . .

**R**ETEMPERING is just as important to fine laboratory glassware as annealing is to fine steel. For this reason every piece of Kimble Exax Graduated Glassware is passed through a specially designed annealing oven or lehr, where it is thoroughly retempered, removing all strains and weak spots. The resultant product is sturdy, and assured of long life and dependable service.

All calibration lines and numerals on Kimble Exax Graduated Glassware are filled with a new blue glass enamel, fused-in as an integral part of the glassware. The chemical industries, the clinical and bacteriological fields, have received this new Blue Line glass-

ware with great enthusiasm. It is easier to read, errors are minimized, and results are uniform and accurate.

Kimble burettes, flasks, cylinders, pipettes and all other units of Exax Graduated Glassware are carefully tested and retested by experts to prevent errors and eliminate blemishes, or imperfections. The fact that the nation's finest research, industrial and clinical laboratories specify and use Kimble Graduated Glassware stamps it definitely as "AMERICA'S STANDARD OF ASSURED ACCURACY"

*Stocked by leading Laboratory Supply Houses throughout the United States and Canada.*

# KIMBLE GLASS COMPANY

VINELAND, NEW JERSEY.

NEW YORK • PHILADELPHIA • BOSTON • CHICAGO • DETROIT



# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

June, 1933

Number 6

### CONTENTS

	PAGE
Obstacles in the No-Diphtheria Path . . . . . <i>W. P. Shepard, M.D.</i>	547
Relation of the Use of Milk to the Physical and Scholastic Progress of Undernourished School Children . . . . . <i>Fred F. Lininger, Ph.D.</i>	555
Fumigation of Foodstuffs . . . . . <i>C. L. Williams, M.D.</i>	561
Precaution When Filing Deferred Certificates . . . . . <i>Stewart G. Thompson, D.P.H.</i>	567
Milk-Borne Disease in Massachusetts, 1930-1932 . . . . . <i>George H. Bigelow, M.D., and Roy F. Feemster, M.D., Dr.P.H.</i>	571
Test Room Studies in Employee Effectiveness . . . . . <i>C. E. Turner, Dr.P.H.</i>	577
Purification of Beet Sugar Wastes . . . . . <i>Max Levine, Ph.D.</i>	585
Administration of a Bureau of Tuberculosis in a City Department of Health <i>H. R. Edwards, M.D.</i>	591
Replacement of Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage . . . . . <i>William H. Park, M.D.</i>	600
Year Book, 1932-1933—Supplement	

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

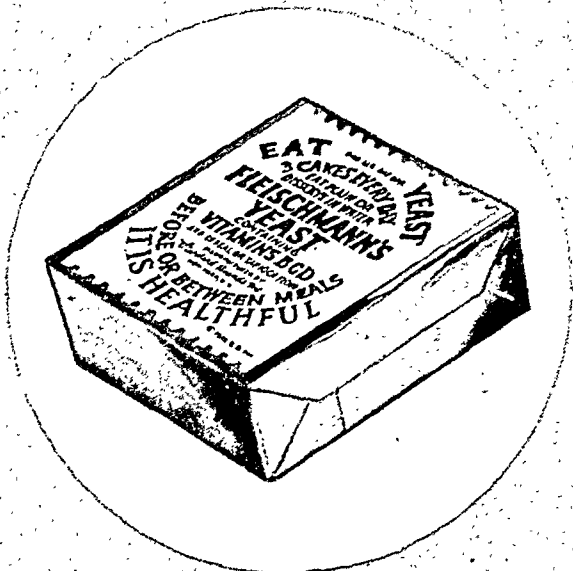
NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

Every expectant and  
nursing Mother needs  
the three  
vitamins  
it contains



**D**URING and after pregnancy and the period of lactation is the time when the human system is most heavily taxed. Certain dietary precautions are now recognized as essential, both for the mother and the unborn or nursing child, at this time.

Vitamin D, for example, must be present in sufficient quantity in the diet to enable the mother properly to absorb and utilize the calcium and phosphorus in her food. And vitamins B and G are necessary for their effect on the mother's general health and the appetite and growth of the child.

Fleischmann's Yeast—now specially "irradiated"—is the richest food source of this group of three vitamins. Each cake con-

tains 60 Steenbock vitamin D units—the equivalent of a teaspoonful of standard cod liver oil.

The vitamin D in Fleischmann's Yeast not only helps the mother to replenish her own stores of calcium and phosphorus, thus protecting her bones and teeth. This vitamin is also transmitted directly to the nursing child—through the medium of the mother's milk.

Because of its exceptional vitamin richness, as well as for its gentle "regulative" effect, Fleischmann's Yeast is being more and more widely recommended during pregnancy and nursing. Prescribe three cakes of *Fleischmann's Yeast* a day—just plain, or dissolved in water, milk or fruit juice.

**SEND FOR IMPORTANT BOOKLET**

Health Research Dept. MI-6, Standard Brands Inc.  
691 Washington St., New York City.

Please send me a copy of the booklet,  
"Yeast Therapy."

Name \_\_\_\_\_

Address \_\_\_\_\_

**IMPORTANT—**

Fleischmann's fresh Yeast is "irradiated" with ultra-violet rays. It is the richest known food in vitamin D. As it is the only yeast that contains three vitamins it is important to specify *Fleischmann's*.



Copyright, 1933, Standard Brands Incorporated

When writing to Advertisers, say you saw it in the JOURNAL

## EDITORIAL SECTION

	PAGE
Air Conditioning and Ventilation . . . . .	603
Milk and Meat Inspection in the United States . . . . .	604
Eating Utensils as a Source of Infection . . . . .	606
The Sixty-Second Annual Meeting . . . . .	607
Association News . . . . .	609
Indianapolis Local Committee. New Members.	
Public Health Administration— <i>Henry F. Vaughan, D.P.H., and Ira V. Hiscock</i> . . . . .	611
Racine, Wis. Milwaukee, Wis. Smallpox Incidence. English Health Insurance. Epidemic of Typhoid Fever in Chamberlain, S. D. Boston, Mass. Orange County, Calif. Cincinnati, Ohio. San Diego, Calif. Maplewood, N. J. Los Angeles County, Calif. Peoria, Ill.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	616
A Test for Reaction-Producing Substances in Concentrated Antipneumococcic Serum, Preliminary Report— <i>L. A. Barnes, Ph.D., and S. D. Kramer, M.D.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	620
Typhoid Fever Mortality in 1931-1932. Preliminary 1933 Edition of Accident Facts. Deaths from Beriberi in Japan. The Homicide Record for 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	625
New Type of Sewage Distributor. Sterilization of Dairy Containers and Utensils With Dry Heat Approved. A Waterborne Epidemic of Typhoid Fever. A Tour of Hamburg. Progress in the Construction of Small Iron Removal Plants. Killing Pond Weeds in Storage Reservoirs. Ipswich Sewage Disposal. Gas Production and Utilization in the Municipal Sewage Works of Blankenburg, Harz.	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	628
Air Cooling by Conduction and Convection. Air Conditioning with Relation to Comfort, Health and Efficiency. The Influence of Respiration and Transpiration on Ionic Content of Air of Occupied Rooms. Further Research on the Production of Carbon Monoxide from Paint in Sealed Compartments. Report of Advisory Committee on Employment of Minors in Hazardous Occupations. Third Report of the Miners' Nystagmus Committee. The Incidence of Color Blindness among Races. Speed of Visual Perception. Influence of Industry on Public Health. Control of the Silicosis Hazard in the Hard Rock Industries—IV, Application of the Kelley Trap to Underground Drilling Operations. A Study of 78 Workers Exposed to Inhalation of Cryolite Dust. Studies in Dust Retention—IV, Dust Retained by the Tracheotomized Cats. Effect of Certain Silicate Dusts on Lungs.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	632
The Winesap Apple as a Source of Vitamin C. The Vitamin C Content of the Winesap Apple as Influenced by Fertilizers. Vitamin A in Six Varieties of Frozen Cherries. Study of the Iodine Content of the New Zealand Seaweed and Fishes. Effect of Irradiated Ergosterol After the Removal of the Parathyroid Glands from Rats. The Fate of Tartaric Acid in the Human Body.	

Continued on page viii

Reprint prices furnished upon request

# DIVIDENDS GUARANTEED

on this  
**INVESTMENT!**

## A Subscription to The American Journal of Nursing

450 Seventh Avenue, New York City

One Year \$3.00      Two Years \$5.00

In combination with  
PUBLIC HEALTH NURSING, \$4.50

I'll invest:

Name \_\_\_\_\_

Address \_\_\_\_\_

# SCHOOL OF HYGIENE AND PUB- LIC HEALTH OF THE JOHNS HOPKINS UNIVERSITY

THE SIXTEENTH SESSION BEGINS OCTOBER 2, 1933

Opportunities for instruction and investigation will be offered in Public Health Administration, Epidemiology, Bacteriology, Immunology, Protozoology, Biostatistics, Sanitary Engineering, Helminthology, Medical Entomology, Physiology as applied to Hygiene, Biochemistry, Sanitary Law, Personal, Social and Mental Hygiene, etc. Practical work is provided through the assistance of the city and state departments of health and other organizations, and arrangements are made for field work during the summer. Courses are organized on a quarterly basis, each quarter consisting of approximately eight weeks. Students may enter the school as candidates for a degree or as special students at the beginning of any quarter. Men and women are admitted on the same terms.

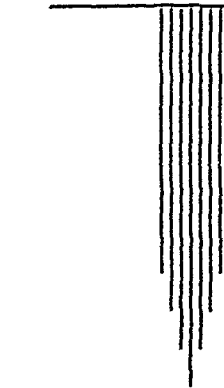
Courses are arranged leading to a Certificate in Public Health, and to the degrees of Doctor of Public Health, Doctor of Science in Hygiene, and Master of Science in Hygiene. The details in regard to the requirements for matriculation in these courses will be forwarded upon application.

For further information or catalogue, address:  
DEAN, SCHOOL OF HYGIENE AND  
PUBLIC HEALTH  
615 NORTH WOLFE STREET  
BALTIMORE, MARYLAND

# COMMUNICABLE DISEASE CONTROL

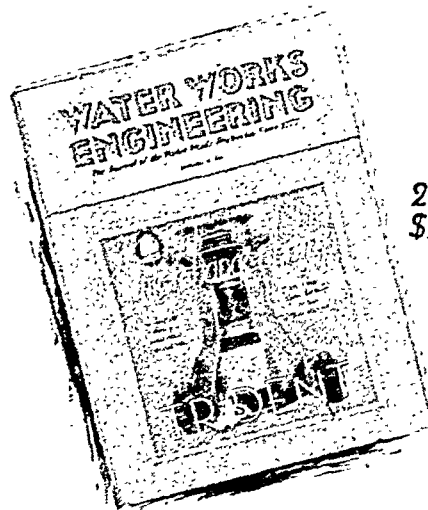
POCKET SIZE HANDBOOK

6" x 3 1/4" — Price \$ .30



Order from the Book Service

American Public Health Association  
450 Seventh Avenue, New York, N.Y.



26 issues  
\$2 a year

# WATER WORKS ENGINEERING

keeps you fully informed on the all important subject of PURE WATER SUPPLY. It is the only publication devoted exclusively to waterworks problems, and is recognized by authorities as the leader in its field.

Copy on request

WATER WORKS ENGINEERING  
24 West 40th Street, New York City  
also publishers of MUNICIPAL SANITATION

*Contents—Continued*

PAGE

Education and Publicity— <i>Evert G. Routzahn</i> . . . . .	634
Health Education for Adults.	
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	637
Public Health Nurses—Ratios to Population in Two States, Wisconsin and Indiana. Bon Voyage for American Nurses! An Opportunity for Public Health Nurses in the Middle West.	
Books and Reports . . . . .	639
Recent Social Trends in the United States. Chronic Enteric Carriers and Their Treatment. Housing Objectives and Programs. Fungous Diseases: A Clinico-Mycological Text. The Development of Mental Health in a Group of Young Children—An Analysis of Factors in Purposeful Activity. The New Healthy Living Series, Books I, II, III, IV. Health Section Report of the Denver Meeting, World Federation of Education Associations. The Chemistry of Tuberculosis. Water Purification Control. Standard Methods for the Examination of Water and Sewage (7th ed.). Farm and Village Housing. The Rheumatic Infection in Childhood. Planning and Building the City of Washington.	
Books Received . . . . .	647
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	648
News from the Field . . . . .	650
Conferences . . . . .	654

## INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Eastman Kodak Company. . . . .	XVII
Book Service . . . . .	XI, XII, XIII, XIV, XV, XXIII	Eimer & Amend, Inc. . . . .	XIX
Disease Chart. . . . .	XV	Fleischmann's Yeast . . . . .	III
Employment Service. . . . .	XX	General Laboratories, Inc. . . . .	XXI
Health Bulletin Service. . . . .	XIV	Gilliland Laboratories, Inc., The. . . . .	II
Membership Application Form. . . . .	VII	Hynson, Westcott & Dunning. . . . .	XIX
Milestones of Public Health Chart. . . . .	IX	Johns Hopkins University, The. . . . .	V
Affiliated Societies . . . . .	XII	Kellogg & Company. . . . .	654
American Journal of Nursing, The. . . . .	V	Public Health Nursing. . . . .	XVIII
Canadian Public Health Journal. . . . .	XV	Sewage Works Journal. . . . .	XVIII
Difco Laboratories . . . . .	Back Cover	Standard Brands, Inc. . . . .	III
Directory of Health Service. . . . .	XXII	Trained Nurse, The. . . . .	XXI
American Water Works Association		Wallace & Tiernan Co., Inc. . . . .	XVI
Bendiner & Schlesinger		Water Works Engineering. . . . .	V
Black & Veatch			
Pease Laboratories			
Record Forms, Remington Rand, Inc.			

# ATTENTION

MEMBERS AND FELLOWS OF THE A.P.H.A.!

*Have You A Friend » »* Who is engaged in public health practice, and who is not a member of the A.P.H.A., and who does not benefit by a personal copy of the

AMERICAN JOURNAL OF PUBLIC HEALTH?

*Then do your bit and ask this Public Health Worker to fill in the coupon below, and return it to the Executive Office.*

On the recommendation of.....

I wish to apply for membership in the American Public Health Association.

Please send me an application blank.

Name.....

Address.....

Present public health occupation.....

**MEMBERS:** Persons professionally engaged in public health work from the United States, Canada, Mexico and Cuba are eligible for election as Active Members. Persons interested in public health, from any country, are eligible for election as Associate Members.

**DUES:** Dues of Members of either class are \$5.00 per year, which includes an annual subscription to the American Journal of Public Health. Persons joining the Association after July 1 are requested to pay \$7.50, covering a year and one-half, from July, 1933, to December, 1934.

**The American Public Health Association**  
450 Seventh Avenue New York, N. Y.

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

July, 1933

Number 7

### CONTENTS

	PAGE
Diphtheria Immunization in Private Practice . . . . .	655
<i>Gaylord W. Anderson, M.D., and George H. Bigelow, M.D., D.P.H.</i>	
The Tuberculosis Movement Today . . . . .	663
<i>Donald B. Armstrong, M.D., Sc.D.</i>	
Smoke Abatement at Low Cost . . . . .	668
<i>Morris M. Cohn, M.Sc. in C.E.</i>	
Bacterial Content of Frosted Hamburg Steak . . . . .	673
<i>Laurence P. Geer, William T. Murray and Ernest Smith</i>	
A Plan to Obtain More Accurate Records of Infant Hygiene Field Work . .	677
<i>C. A. Sargent, M.D.</i>	
Nonspecific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer . . . . .	681
<i>John F. Anderson, M.D., George F. Leonard, M.D., and August Holm, Sc.D.</i>	
Prevention of Lead Poisoning in Industry . . . . .	687
<i>G. H. Gehrman, M.D.</i>	
Agglutination in the Diagnosis of Enteric Disease . . . . .	693
<i>Ruth Gilbert, M.D., and Marion B. Coleman</i>	
Relationship Between Health Officer and Nurse . . . . .	697
<i>Jacob C. Geiger, M.D.</i>	
Frozen Vegetables . . . . .	700
<i>Robert P. Straka and Lawrence H. James</i>	
Analyses of Six New York Beers . . . . .	704
<i>Walter H. Eddy, M.D.</i>	

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.





A NEIGHBOR, passing by, glances through your window and sees you in the living-room. But you are around the corner on Main Street, ordering from the druggist. You are in a nearby town, chatting with a friend. You are in a distant city, delivering a message of cheer and reassurance. You are across a continent, or an ocean, talking clearly and easily, as if distance had ceased to be. . . . Your neighbor, returning, glances in again. You are still in your living-room.

Your telephone is you. In a moment it multiplies and projects your personality to many different places and many different people, near or far. Part of your very self is in every telephone message—your thoughts, your voice,

your smile, your words of welcome, the manner that is you. The extraordinary fact is that the more you use your telephone, the more it extends your power and personality.

All you see is the familiar telephone instrument in your office or home. Back of it are hundreds of thousands of trained employees, attending almost endless stretches of wire—so that you may call, easily and quickly, any one of more than sixteen million telephones in this country and an additional thirteen million in other lands.

*You are cordially invited to visit the Bell System Exhibit in the Communication Building, Century of Progress Exposition, Chicago.*

AMERICAN TELEPHONE AND TELEGRAPH COMPANY



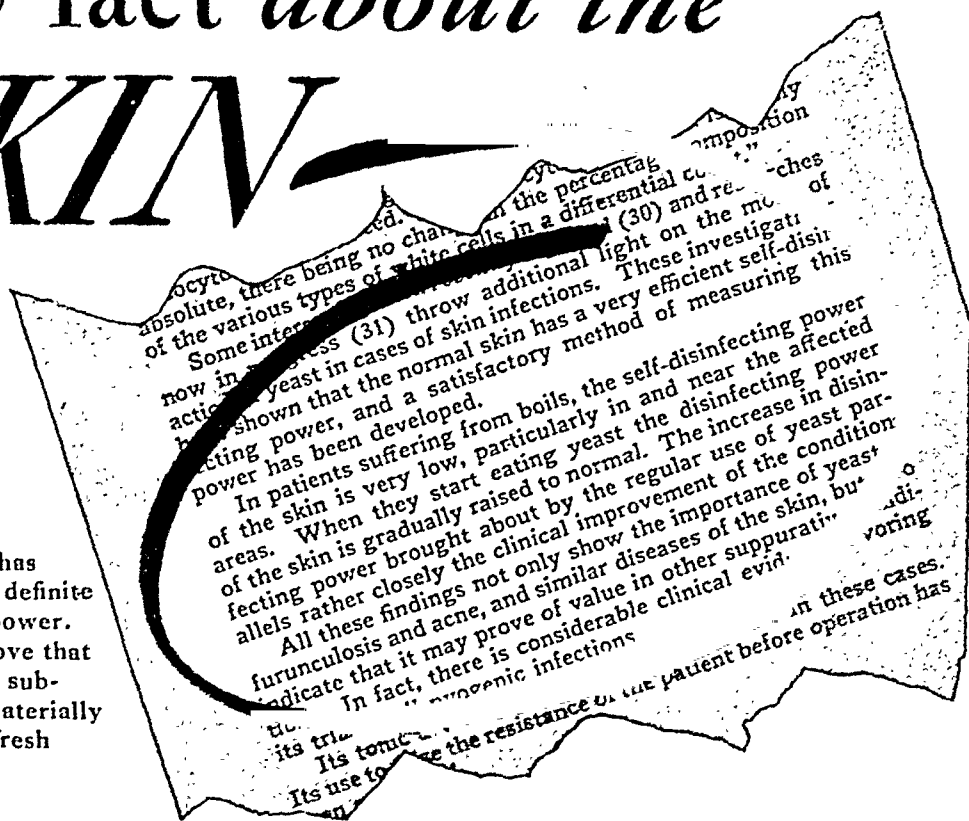
# EDITORIAL SECTION

	PAGE
A Triumph for Public Health . . . . .	705
Differentiation of Human from Bovine Tubercle Bacilli . . . . .	706
Conservation of Water . . . . .	707
The Western Branch Meeting . . . . .	708
Association News . . . . .	709
Indianapolis—October 9–12. Announcement of the 1933 Inter-Chamber Health Conservation Contest. Indianapolis Hotel Rates. New Members. Deceased Members. Applicants for Fellowship. Vital Statistics Institute Proposed for 1934. Frederic Poole Gorham, 1871–1933. Earl Max Pickens, D.V.M. A Nation's Investment in Health.	
Public Health Administration— <i>Henry F. Vaughan, Dr.P.H., and Ira V. Hiscock</i> . . . . .	718
Salem, Mass. Lynn, Mass. Indiana. Venereal Disease Clinics. Knoxville, Tenn. Schenectady, N. Y. Chicago, Ill.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	720
The Use of Glycerol as a Preservative for Milk Specimens to Be Examined for Hemolytic Streptococci— <i>Ruth Gilbert, M.D., and M. E. Clark.</i>	
A Study of the Brom-Thymol-Blue Reaction in Freshly Drawn Milk— <i>C. S. Bryan.</i>	
Letter from Great Britain— <i>Charles Porter, M.D.</i> . . . . .	725
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	728
Two Studies in the Psychological Effects of Noise. School Health Education. Treatment and Prevention of Heat Cramps. Maternity Leave in Denmark. An Enquiry in Poland. State Silicosis Laboratory in Mexico. Annual Report, Bureau of Occupational Diseases, Ohio Department of Health, 1932. Compensation for Occupational Diseases in French West Africa. Safety in the Manufacture and Use of Celluloid. Medical Certificates and Industrial Diseases. The Occupational Progress of Women, 1910–1930. Workmen's Compensation in Pulmonary Disease. Health Hazards from Specific Poisons in Industry. Dust Elimination in the Pottery Industry. Review of Literature Dealing with Health Hazards in Spray Painting.	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	733
Increase in Heart Disease. Low Records for Contagious Diseases. Diphtheria Mortality in Alabama. Mortality in Certain States During 1932, with Comparative Data for Recent Years. Smallpox in the United States and Canada, 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	737
The Corrosion of Metals by Milk. Jute Causes Trouble. Air Conditioning for Small Buildings. Chlorinating an Open Bathing Beach. Comparison of Results with Standard Lactose, Brilliant Green Bile, and Dominick-Lauter Broths. Industrial Wastes Which May or May Not Enter Sewers. Operating Costs of Sewage Treatment in North Carolina. Interceptor and Sewage Disposal Works at Fort William, Ont.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	740
Effects of Freezing on the Spores and Toxin of <i>Glostridium Botulinum</i> . The Germicidal Efficiency of Sodium Hydroxide. The Action of Hexylresorcinol on Bacteria in Certain Food Products. Microbiology of Frozen Foods—IV, Longevity of Certain Pathogenic Bacteria in Frozen Cherries and in Frozen Cherry Juice. Microbiology of Frozen Foods—V, The Behavior of <i>Clostridium Botulinum</i> in Frozen Fruits and in Vegetables.	

Continued on page viii

Reprint prices furnished upon request

# Here is an Important new fact *about the* **SKIN**



Normal skin, it has been found, has a definite self-disinfecting power. Investigations prove that this power, when sub-normal, can be materially raised by eating fresh yeast regularly.

**I**N the treatment of furunculosis and other suppurative skin disorders fresh yeast has long been known as an extremely effective aid. Important new light has now been thrown on its *mode of action* in such cases.

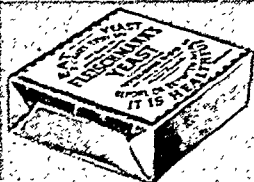
Research has shown that normal skin has a marked self-disinfecting power . . . and that a definite decrease in this power accompanies skin disorders. It has also been found that adding fresh yeast to the diet brings about a quick increase in the destruction of test microorganisms applied to the skin's surface.

Of course, the gentle laxative action of

fresh yeast is decidedly helpful in treating skin disorders. By promoting regular elimination, it checks putrefaction and so helps prevent the absorption of toxins. Unlike drugs, fresh yeast actually *strengthens* the intestinal muscles instead of weakening them.

Moreover, the vitamin content of Fleischmann's Yeast raises the general resistance. It is the richest known food source of the group of vitamins B, G and D.

Prescribe this food in connection with other treatments in cases of furunculosis, acne, etc. Recommend three cakes a day—a cake before each meal—plain or dissolved in a third of a glass of water.



**A corrective  
food...  
very rich in  
Vitamins B, G, D**

Health Research Dept. MI-7, Standard Brands Inc.  
691 Washington St., New York City  
Please send me new edition of "Yeast Therapy,"  
based on the findings of noted investigators.

Name

Address

Contents—Continued

	PAGE
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	744
The Effects of Unemployment on Children and Young People in Germany.	
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	747
Visiting Nurses and Communicable Disease. Every Public Health Nurse Should Have a Set. Nurses Save Taxpayers.	
Education and Publicity— <i>Ewart G. Routzahn</i> . . . . .	751
What to Say About Low Death Rates in the Depression. National Award to Birmingham's Health Department. Reconstruction As of 1934. The Second Health Education Institute. The "Jig-Saw" Simplified. "The Jigsaw Puzzle of Health Publicity." Nutrition Demonstrations for Relief Workers. New Popular Movies on Milk and Diphtheria. New Movie for Medical Audiences. Where East and West Meet.	
Books Received . . . . .	756
Books and Reports . . . . .	757
Directory of Psychiatric Clinics in the United States. Twenty-First Annual Report of the International Association of Dairy and Milk Inspectors. Research on the Constitution of the Japanese with Special Reference to the Physical Capacity. The Policewoman's Handbook. Why We Do It: A Study of Normal, Subnormal, and Abnormal Human Behavior. A Decade of District Health Center Pioneering: A 10-Year Report of The East Harlem Health Center. Laboratory Manual, Methods of Analysis of Milk and Its Products. Improvised Equipment in the Home Care of the Sick (2d ed.). A General History of Nursing. Hospitals and Child Health—White House Conference on Child Health and Protection. The Rise of Preventive Medicine. General Principles Governing the Prevention of Tuberculosis—League of Nations publication. The Vitamins in Health and Disease.	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . . .	766
News from the Field . . . . .	768
Conferences . . . . .	772

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A.....	X	Fleischmann's Yeast.....	V
Book Service....XII, XIV, XV, XVI, XXI, XXII		General Foods.....	XII
Disease Charts.....	XIX	Gilliland Laboratories, Inc., The.....	XI
Employment Service.....	XXIV	Hynson, Westcott & Dunning.....	XIX
Health Bulletin Service.....	XIV	International Equipment Company.....	XVII
Membership Application Form.....	XVIII	Johns Hopkins University, The.....	XV
Affiliated Societies.....	XII	Journal of Clinical Investigation, The.....	XI
American Journal of Nursing, The.....	XVII	Kellogg & Company.....	773
American Telephone & Telegraph Company	III	Kimble Glass Company.....	II
Canadian Public Health Journal.....	773	Municipal Sanitation.....	XVII
Difco Laboratories.....	Back Cover	Postum.....	VII
Directory of Health Service.....	XXIII	Psychoanalytic Quarterly, The.....	IX
American Water Works Association		Squibb & Sons, E. R.....	XIII
Bendiner & Schlesinger		Standard Brands, Inc.....	V
Black & Veatch		Trained Nurse, The.....	XV
Committee on Administrative Practice,		Wallace & Tiernan Co., Inc.....	XX
A.P.H.A.			

# INDICTED FOR BURGLARY!



FOR YEARS he has robbed his body of the rest that is its due. Stealing an hour here . . . an hour there . . . trying to cover up his thefts with the false energy of stimulants.

Now he stands indicted . . . on the ragged edge of a breakdown.

You know the type. Usually he turns to you . . . asking you to fix things up. And if you find it advisable to bar coffee from his diet . . . you know how hard it will be for him.

## *Postum can be a real help*

In such cases, Postum can make it easier for your patient. It is so good that forbidden drinks are soon forgotten. And it contains no caffeine . . . no stimulant of any kind. It is simply whole wheat and bran, slightly sweetened and roasted.

Postum comes in two forms, Postum Cereal, the kind that is boiled, and Instant Postum, made instantly in the cup. Don't miss the fascinating Postum show — Foods and Agricultural Building, Chicago World's Fair.

*If you will write us we shall be glad to send a special gift package containing a full-size package of Instant Postum, together with samples of Grape-Nuts, Grape-Nuts Flakes, Post Toasties, Post's Whole Bran and Post's Bran Flakes. General Foods, Dept. PV-733, Battle Creek, Mich. If you live in Canada, address General Foods, Ltd., Dept. PV-733, Cobourg, Ont. (This offer expires July 1, 1934.)*



# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

August, 1933

Number 8

### CONTENTS

	PAGE
Loss of Actinic Sunshine as a Health Problem of Cities . . . . .	775
<i>Fred O. Tonney, M.D.</i>	
Is Malnutrition Increasing? . . . . .	784
<i>Esther Jacobs</i>	
Seasonal Distribution of Whooping Cough for Periods of High and Low Incidence . . . . .	789
<i>G. E. Harmon, M.D.</i>	
The Fence or the Ambulance (poem) . . . . .	796
<i>John N. Hurty, M.D.</i>	
Epidemiology of Syphilis and Gonorrhea . . . . .	797
<i>William L. Munson, M.D.</i>	
Discussion, by <i>Edward S. Godfrey, Jr., M.D.</i> . . . . .	808
Practical Uses of Diphtheria Immunization Records . . . . .	809
<i>Edward S. Godfrey, Jr., M.D.</i>	
Inaugural Address, at Fourth Annual Meeting of the Western Branch . . .	813
<i>J. L. Pomeroy, M.D.</i>	
The Training of Health Personnel . . . . .	816
<i>W. S. Leathers, M.D., and A. E. Keller, M.D.</i>	
The Relationship of Public Health to the Doctor in Private Practice . . .	824
<i>Charles W. Decker, M.D.</i>	

### EDITORIAL SECTION

The Indianapolis Meeting . . . . .	826
Charles Porter, M.D. . . . .	827
Epidemiology and Air Travel . . . . .	828

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

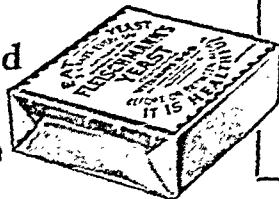
# A fact of great importance during Pregnancy—

*only 4 common foods contain more than a trace of*

FOOD	VITAMIN D
<b>VEGETABLES</b>	
Asparagus	0
Beans, Lima	0
Beans, String	0
Beets	0
Cabbage	0
Carrots	0
Celery	0
Lettuce	0
Potatoes	0
Spinach	0
<b>FRUITS</b>	
Apples	0
Bananas	0
Grapefruit	0
Lemon juice	0
Orange juice	0
Pineapple	0
Prunes	0
<b>MEATS AND FISH</b>	
Meat	0
Liver	0
Fish (Average)	Trace
Fish (Fatty)	XXX
Oysters	Trace
<b>DAIRY PRODUCTS</b>	
Butter	X Var.
Buttermilk	0
Cheese	0
Milk	X Var.
Eggs (Yolk)	XX Var.
<b>CEREALS</b>	
Barley	0
Oatmeal	0
Bread (Regular)	0
Rice	0

Milk, butter, eggs and fatty fish are the only four common foods that contain more than traces of Vitamin D . . . and the first three of these contain variable amounts of this vitamin.

**A corrective food  
rich in  
Vitamins B, G, D**



**CLINICIANS AGREE** that pregnant and nursing mothers today get too little vitamin D, even when they eat a "varied" diet. Only four common foods contain more than a trace of it, and three of these are undependable sources. And the body cannot store for long the small amounts absorbed from limited exposure to the summer sun.

As you know, vitamin D controls the calcium and phosphorus content of the blood. Even if the mother receives sufficient vitamin D to prevent rickets in the child, she may not get enough to replace the calcium and phosphorus drawn from her own system.

Adding Fleischmann's Yeast to the daily diet is an easy way to make sure that the expectant or nursing mother receives enough vitamin D. Now "irradiated," Fleischmann's Yeast is the richest food source of vitamin D. Each cake contains 60 Steenbock vitamin D units—the equivalent of a full teaspoonful of standard cod liver oil.

In addition, Fleischmann's Yeast is very rich in vitamins B and G and has a gentle laxative and tonic action, as you know.

Simply recommend 3 cakes a day—one before each meal—dissolved in water, milk or fruit juice.

Health Research Dept. MJ-8, Standard Brands Inc.  
691 Washington St., New York City  
Please send me new edition of "Yeast Therapy,"  
based on the findings of noted investigators.

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1933, Standard Brands Incorporated

# Contents—Continued

	PAGE
Letter from Great Britain— <i>Charles Porter, M.D.</i> . . . . .	831
Association News . . . . .	834
The Indianapolis Meeting— <i>William F. King, M.D.</i>	
Annual Meeting Information: Reduced Railroad Fares. Railroad Rates from Various Centers to Indianapolis, Ind. To Those Who Motor. Railroad Mileages from Principal Cities in U. S. to Indianapolis. Indianapolis—Map of Downtown District. Indianapolis Hotel Rates. Indianapolis Is Centrally Located (with Map of Indiana and Surrounding States). New Members. Additional Applicants for Fellowship. Nominations for the Governing Council. Radio Broadcast.	
Public Health Administration— <i>Henry F. Vaughan, Dr.P.H., and Ira V. Hiscock</i> . . . . .	844
Hartford, Conn. Edmonton, Alberta. New Britain. Brookline, Mass. Attleboro, Mass. Warwick, R. I. Lorain County General Health District.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	847
Value of Culture Tests in the Diagnosis of Diphtheria— <i>Hazel M. Hatfield, M.D., and Alice G. Mann.</i>	
A Convenient Feces Specimen Container— <i>M. Frobisher, Jr.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	853
Diphtheria Mortality in Large Cities of the United States in 1932. Provisional Figures for Live Births, Infant Mortality, and Stillbirths in the Birth Registration Area (Exclusive of Massachusetts and Utah) in Continental United States, 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	856
A Deep Water Sampling Rod— <i>Louva G. Lcnert.</i>	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	858
Report of the Preschool Center Program of the Cleveland Child Health Association— <i>E. V. Thichoff, M.D.</i>	
Report of an Experiment Determining the Effect of Weather on Children's Sleep.	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	861
Psychrometer Has Two Wet Bulbs. The Presence of Lead Dust and Fumes in the Air of Streets, Automobile Repair Shops, and Industrial Establishments of Large Cities. Safety Regulations for Refrigeration Equipment. Noise in Heating and Air Conditioning: Where It Occurs and How It Is Prevented. The Effect of Viosterol on the Excretion of Lead. Sulfur Dioxide in Pittsburgh Air. The Roentgenological Aspects of Pneumoconiosis and Its Medico-Legal Aspects. Toxicity of Osmium Tetroxide (Osmic Acid). Obtaining Comfort Conditions by Controlled Radiation from Electrically Heated Walls. Physiologic Changes During Exposure to Ionized Air. Carbon Monoxide Distribution in Relation to the Heating and Ventilation of a One-Floor Garage. The Application of the Eupathoscope for Measuring the Performance of Direct Radiators and Convectors in Terms of Equivalent Temperature. Necessity for Bureau of Occupational Diseases, Connecticut. Indices of Air Change and Air Distribution. Occupational Disease Compensation, Pennsylvania. Industrial Medicine in France. Obituary—Sir Arthur Whitelegge. Silicosis and Tuberculosis Among Miners of the Tri-State District of Oklahoma, Kansas, and Missouri—I. Occupational Disease Decisions. Ventilation of Factories and Workshops.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	869
The Copper, Iron and Manganese Content of Fish. Vitamin G (B <sub>2</sub> ) in Fruits. The Chemical Nature of Vitamin C. The Effect of Cooking on the Vitamin A and C Content of Fresh and Dried Apricots. Mottled Enamel Produced by Water Containing Sodium Fluoride. A Comparison of Apricots and Their Carotene Equivalent as Sources of Vitamin A.	

Continued on page viii  
Reprint prices furnished upon request



... Announcing ...

# Alum Precipitated DIPHTHERIA TOXOID

(Gilliland)

## Single Injection

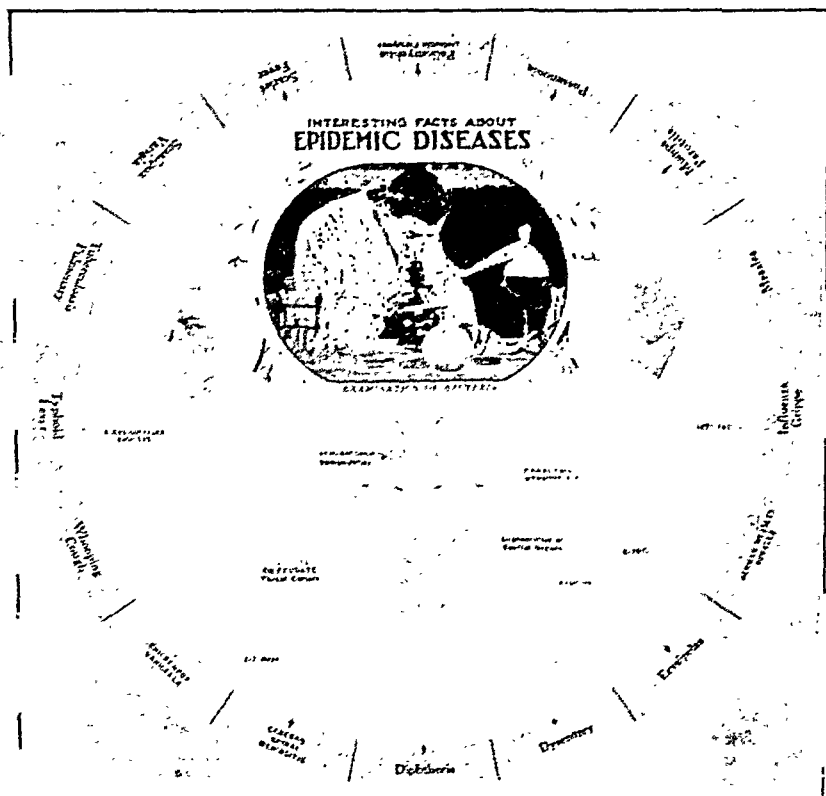
The superior immunizing value and the higher percentage of immunity following the use of a single injection of Alum Precipitated Toxoid has been demonstrated.

*J. A. M. A.*, 100:14, Apr. 8, 1933; *J. Med. Assoc. State of Ala.*, 2:8, Feb., 1933.

Supplied in packages sufficient for One, Ten and Fifteen Treatments.

*Additional Information and Prices on Request*

The Gilliland Laboratories, Marietta, Pa.



Here on a circular revolving plaque 10 inches in diameter are given important facts about 32 communicable diseases.

The pointer is set to the disease about which information is desired and through skillfully cut openings appear the cause, prophylaxis, complications, temperature, diagnostic sign, pathology, case mortality, quarantine period and incubation period.

This chart is the work of Dr. Charles V. Craster, Health Officer of Newark, N. J., and is being sold through the Syndicated Health Bulletin Service of the A.P.H.A.

Price \$35 each, including postage

*Special prices in quantities*

*Order From*

American Public Health Association, 450 Seventh Ave., New York

When writing to Advertisers, say you saw it in the JOURNAL

Contents—Continued

PAGE

Public Health Nursing—*Eva F. MacDougall, R.N.* . . . . . 873

Highlights of the Health Education Conference Held at Ann Arbor Under the Auspices of the American Child Health Association. The League Meeting in Chicago. The N.O.P.H.N.

Education and Publicity—*Evart G. Rontzahn* . . . . . 875

Health Education at Indianapolis. A Century of Progress. What Have You? Again Behind the Front Lines. Sixty Is the Limit. Broadcasting in Manitoba. Institute for Visual Education. Health Examinations But a Part of a Whole. Emergency Relief Diet Demonstration. Inner-Convention Interpretation. Health Material in Libraries. Health Plays. Honorable Mention. Health Education. Health Work in Schools.

Books Received . . . . . 881

Books and Reports . . . . . 882

Peace of Mind and Body. Child Care Today. The New Dentistry: A Phase of Preventive Medicine. Amateur Nurse. The Examination of Water and Water Supplies. The Medical Secretary. Die soziale Bedeutung und Beurteilung der Kreislauferkrankungen. Annual Report of the Bureau of Sanitary Engineering, Maryland State Dept. of Health, 1932. Social Work and Educational Problems in Germany. American Red Cross First Aid Text-Book. Official Proceedings of the Thirty-Eighth Annual Convention of the American Society of Municipal Engineers. Towards Mental Health: The Schizophrenic Problem.

A Selected Public Health Bibliography—*Raymond S. Patterson, Ph.D.* . . . 889

News from the Field . . . . . 891

Conferences . . . . . 894

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Eimer & Amend, Inc. . . . .	XVII
Book Service . . . . .	XI, XII, XIV, XX	Federation of Sewage Works Assns. . . . .	IX
Disease Charts . . . . .	V	Fleischmann's Yeast . . . . .	III
Employment Service . . . . .	XXII	General Laboratories, Inc. . . . .	IX
Health Bulletin Service . . . . .	XIV	Gilliland Laboratories, Inc., The . . . . .	V
Membership Application Form . . . . .	XV	Hynson, Westcott & Dunning . . . . .	XIII
Affiliated Societies . . . . .	XXII	Johns Hopkins University, The . . . . .	XIX
American Journal of Nursing, The . . . . .	XIX	Kellogg & Company . . . . .	II
Canadian Public Health Journal . . . . .	XVII	Municipal Sanitation . . . . .	XIX
Difco Laboratories . . . . .	Back Cover	Psychoanalytic Quarterly, The . . . . .	XXIII
Directory of Exhibits, Annual Meeting A.P.H.A. . . . .	XVIII	Sewage Works Journal . . . . .	IX
Directory of Health Service . . . . .	XXI	Standard Brands, Inc. . . . .	III
American Water Works Association		Trained Nurse, The . . . . .	XIII
Bendiner & Schlesinger		Wallace & Tiernan Co., Inc. . . . .	XX
Black & Veatch		Water Works Engineering . . . . .	XIX
Committee on Administrative Practice, A.P.H.A.			
Record Forms, Remington Rand, Inc.			

When writing to Advertisers, say you saw it in the JOURNAL

# PROCEEDINGS

of the

## Southern Branch, American Public Health Association 1932

This publication of the first meeting of the Southern Branch of the American Public Health Association is now available.

The contents include: List of all officials and the Constitution and By-Laws; *Health Problems Peculiar to the Southern States* by Dr. John A. Ferrell; *The History of Public Health in the South* by Dr. W. S. Leathers; *A Study of the Effectiveness of Rural Public Health Nursing Service* by Miss Zoe La Forge; *A Study of the Effectiveness of Rural Excreta Disposal* by Mr. H. A. Kroeze; *Present Knowledge of Poliomyelitis* by Dr. W. T. Harrison; *Epidemiology and the Laboratory in Detection of Typhoid Carriers* by Dr. Leon C. Havens; *The Proper Scope and the Effectiveness of Maternity Service in Health Departments* by Dr. Annie Veach; *Community Child Hygiene Program* by Dr. J. H. Mason Knox; *Relative Values in Milk Sanitation* by Mr. L. C. Frank; *The Health Education Program in Jefferson County, Alabama* by Miss Fleta McWhorter; *The Public Health Nurse in the School Health Program* by Miss Frances Hagar; *A State-Wide Dental Program* by Dr. N. T. Ballou; and *Problems and Progress in State Health Administration* by Dr. C. W. Garrison.

100 pages—Paper covered—Size 9½ x 6¼

PRICE PER COPY 50 CENTS

Order from

The American Public Health Association  
450 Seventh Avenue New York, N. Y.

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

September, 1933

Number 9

### CONTENTS

	PAGE
The Sanitary Control over the Production and Handling of Shellfish on the Pacific Coast . . . . .	895
<i>Carl E. Green</i>	
Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity . . . . .	901
<i>Elizabeth Parkhurst</i>	
The Treatment of Water by Certain Forms of Silver . . . . .	910
<i>James Gibbard</i>	
A Study of the Opsono-Cytophagic Power of the Blood of Allergic Skin Reaction in Brucella Infection and Immunity in Man . . . . .	917
<i>I. Forest Huddleson, Howard W. Johnson, and E. E. Hamann</i>	
Toxicity of Organic Fluorides . . . . .	930
<i>William P. Yant</i>	
The Incidence of Xerophthalmia and Night-Blindness in the United States—A Gauge of Vitamin A Deficiency . . . . .	935
<i>Alfred F. Hess, M.D., and Daniel B. Kirby, M.D.</i>	
A Modified Quevenne Lactometer for the Public Health Laboratory Control of Market Milk . . . . .	939
<i>R. V. Stone</i>	

### EDITORIAL SECTION

The Depression and Health . . . . .	943
Malarial Fever . . . . .	944
Nonspecific Immunity by Heterologous Vaccination . . . . .	946
Letter to the Editor— <i>Bradford Massey, M.D.</i> . . . .	948
Preliminary Program of the Sixty-second Annual Meeting . . . . .	949

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

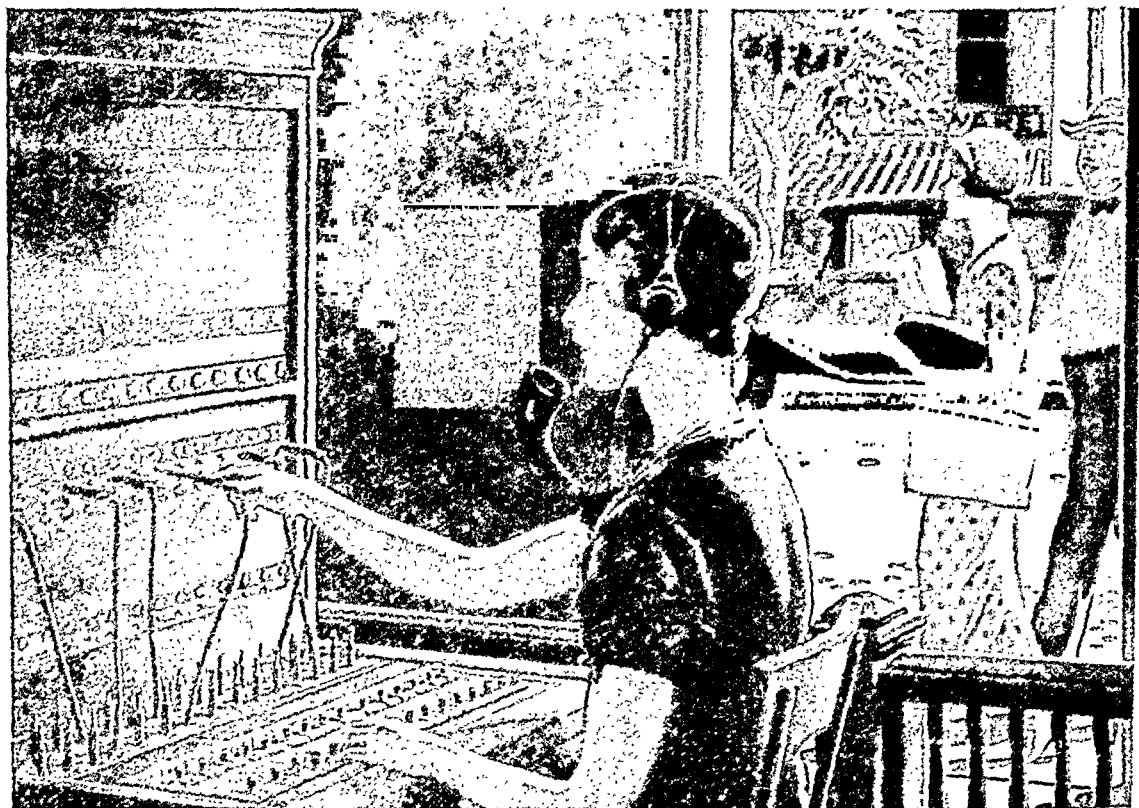
Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.



## FRIEND AND NEIGHBOR

CLOSE to those who live in small towns, and farther out upon the farms, is the helpful service of the telephone operator. In the truest sense, she is both friend and neighbor. Ties of kinship and association bind her to those whose voices come across the wires.

Bright and early in the morning she puts through a call that helps a farmer locate a drill for sowing oats. Another connection finds out if Jim Thomas, "over near Bogard," is feeding a bunch of calves and needs any shelled corn. Another gets the latest price on heavy hogs for Bill Simpson.

Through the day she aids in calling a doctor for Mrs. Moore, whose baby is ill. Plugs in an emergency call that sends an ambulance east

of town. Puts through a long distance call for Bob Roberts, whose boy attends the state college. Then, through the night, stands ever ready to help those in need.

Constantly in her mind and activities is one fixed, guiding purpose . . . "*Speed the call!*" And the further thought that she serves best when she serves with courtesy and understanding.

In the bustle of the city, as in town and country, that is the creed of every employee of the Bell System. Its faithful observance in so large a percentage of cases is an important factor in the value of your telephone service.



AMERICAN TELEPHONE  
AND TELEGRAPH COMPANY

	PAGE
Association News . . . . .	973
Main Indiana Highways to Indianapolis. Indianapolis Annual Meeting in 1900. New Members. Applicants for Fellowship.	
Public Health Administration— <i>Henry F. Vaughan, Dr.P.H., and Ira V. Hiscock</i> . . . . .	976
Dairy and Milk Inspectors' Training Course. Distribution of Dysentery. Bellevue-Yorkville Health District. Whooping Cough Vaccination.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	978
Laboratory Aids in the Diagnosis and Serum Therapy of Pneumococcus Pneumonia— <i>Albert B. Sabin, M.D.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	983
Provisional Summary of Mortality from Automobile Accidents in the United States Registration Area, 1932. Vital Statistics for Germany, 1932. A Brief Statistical Analysis of Sanitary Conditions in Porto Rico During the Last Decade. Deaths from External Violence in Canada, 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	987
Jail Sentence for Maintaining Cross Connections. Why Not Make Garbage Collection and Disposal Self-sustaining? The First Completely Air Conditioned Theatre in Spokane. Ammonia Chlorine Treatment Used on East Providence, R. I., Water Supply. Institutional Sewage and Sewage Flow Characteristics. The Electrical Precipitation of Sewage. An Unusual Sewage Treatment Plant. The Effect of Pasteurization Upon <i>Brucella Melitensis</i> Var. Suis.	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	990
Chemical Haematuria from Handling 5-Chloro-Ortho-Toluidine. An Outbreak of Dermatitis in Cotton Mills Due to Varnish. A Case of Carbon Monoxide Poisoning from an Oil Stove. The Relation of Carcinogenicity of Mineral Oils to Certain Physical and Chemical Characteristics of These Oils. Sand and Metallic Abrasive Blasting as an Industrial Health Hazard. Pulmonary Asbestosis: Its Clinical, Radiological and Pathological Features, and Associated Risk of Tuberculosis Infection. Filtered Air Relieves Hay Fever. Industrial Diseases of the Skin. Effects of Dust Upon the Respiratory System. Arsenic Poisoning in a Manganese Factory.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	994
The Character of the Dermatitis-Producing Factor in Dietary Egg White as Shown by Certain Chemical Treatments. Effect of Sunshine Through Window Glass and Fresh Air on Resistance to Infection. Food Poisoning Due to Staphylococci. Studies on the Physiological Action of Glycerol on the Animal Organism.	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	997
The Tuberculin Skin Test from the School Physician's Standpoint— <i>L. W. Childs, M.D.</i>	

Continued on page viii

Reprint prices furnished upon request

# Accuracy in BLUE LINE EXAX PIPETTES

**K**IMBLE Blue Line Exax Pipettes are made from extra heavy tubing of very uniform bore, automatic-machine-made, carefully selected to eliminate pieces with blisters, stones or streaks.

## IMPORTANT FEATURES:

1. Designed to deliver contents accurately and at a proper speed.
2. Delivery ends are tapered gradually; tips are ground and slightly bevelled.
3. The tops are smoothly finished.
4. Volumetric and other pipettes have joints that are carefully made without constrictions.
5. Expertly calibrated at 20°C to deliver capacity by free outflow through tip. No drainage period allowed. Where the small amount remaining in the tip is to be added this is indicated by a frosted band at the top.
6. All calibration lines are deeply acid-etched and filled with a durable blue fused-in glass enamel.
7. An entirely new type of calibration lining for accurate and rapid reading. Short lines for intermediate divisions with encircling lines at the main graduation points.
8. Retested and retempered (strain-free).

## VOLUMETRIC AND CSTMALD PIPETTES

Size	Tolerance	Size	Tolerance
1 ml.	±0.012 ml.	15 ml.	±0.06 ml.
2 ml.	.012 ml.	20 ml.	.06 ml.
3 ml.	.02 ml.	25 ml.	.06 ml.
4 ml.	.02 ml.	50 ml.	.10 ml.
5 ml.	.02 ml.	100 ml.	.16 ml.
10 ml.	.04 ml.	200 ml.	.20 ml.

## MEASURING AND SEROLOGICAL PIPETTES

1/10 ml.	±0.005 ml.
2/10 ml.	.008 ml.
1 ml.	.02 ml.
2 ml.	.02 ml.
5 ml.	.04 ml.
10 ml.	.06 ml.
25 ml.	.10 ml.

**KIMBLE GLASS COMPANY.**  
VINELAND, NEW JERSEY.  
NEW YORK • PHILADELPHIA • BOSTON • CHICAGO • DETROIT

STOCKED BY LEADING LABORATORY SUPPLY HOUSES  
THROUGHOUT THE UNITED STATES AND CANADA

## Contents—Continued

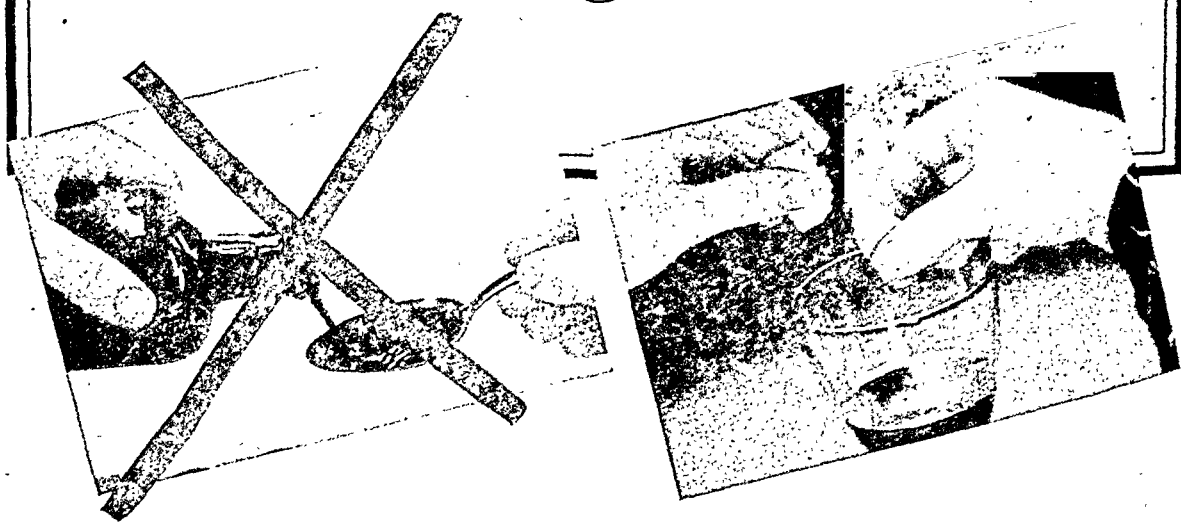
	PAGE
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	1000
Nursing Education in the Future. Canadian Appointment of Nurse as Health Consultant. A Visiting Nurse Association Serves Research. For Superintendents and Supervisors Only.	
Education and Publicity— <i>Ewart G. Routzahn</i> . . . . .	1002
Prenatal Letters Increasing in Demand. "Better Health Verse at Hand." "Healthland" at Farmers' Picnic. A 2,000 Year Old Idea. "Interpreting Medicine to the Public." Wanted at Indianapolis. Write Before You Pack. "Mass Education." Current Facts on Health. Attractive Information About Low Cost Diet. <i>Hygeia</i> for August, 1933. Suppose We Compare Notes. A Radio Contest. Reporting. <i>Hygeia</i> for July, 1933. Depression Discussion. School—The Child. Motion Pictures. Educational Material. It May Be Here. Honorable Mention. A Diphtheria Display Idea.	
Books and Reports . . . . .	1010
Medical Biology: A Laboratory Manual of Bacteriology, Mycology, Immunology and Parasitology—Consisting of Experimental Guide, Interpretive Text, Atlas and Protocol Form. Reports, National Quarantine Service, Series III—1932. The Approach to the Parent: A Study in Social Treatment. Nervous and Mental Diseases for Nurses (2d ed.). Stop That Smoke. Broadcasting Health. Obstetrics for Nurses (10th ed.).	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . .	1015
Books Received . . . . .	1015
News from the Field . . . . .	1016
Conferences . . . . .	XXI

## INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Directory of Health Service . . . . .	XXVII
Book Service . . . . .	XII, XIV, XIX, XXIX	Pease Laboratories, Inc.	
Directory of Exhibits, Annual Meeting,		Remington Rand, Inc.	
Indianapolis . . . . .	XXIV, XXV	Eastman Kodak Company . . . . .	XXIII
Disease Charts . . . . .	XXII	Federation of Sewage Works Associations . .	XIII
Employment Service . . . . .	XXVIII	Fleischmann's Yeast . . . . .	VII
Health Bulletin Service . . . . .	XIV	Gilliland Laboratories, Inc., The . . . . .	IX
Membership Application Form . . . . .	XXVI	Hynson, Westcott & Dunning . . . . .	IX
Second Institute on Health Education,		International Equipment Company . . . . .	XIII
Annual Meeting, Indianapolis . . . . .	XVII	Johns Hopkins University, The . . . . .	XIX
Affiliated Societies . . . . .	XII	Journal of Dairy Science . . . . .	XVIII
American Journal of Nursing, The . . . . .	XIX	Kellogg & Company . . . . .	II
American Telephone & Telegraph Company	III	Kimble Glass Company . . . . .	V
Canadian Public Health Journal . . . . .	XVIII	Psychoanalytic Quarterly, The . . . . .	XVI
Cereal Soaps Co., Inc. . . . .	XXI	Public Health Nursing . . . . .	XXV
Derbac . . . . .	XXI	Sewage Works Journal . . . . .	XIII
Difco Laboratories . . . . .	Back Cover	Squibb & Sons, E. R. . . . .	XI
Directory of Health Service . . . . .	XXVII	Southern Branch, A.P.H.A., Proceedings of	XV
American Water Works Association		Standard Brands, Inc. . . . .	VII
Bendiner & Schlesinger		Trained Nurse, The . . . . .	XXII
Black & Veatch		Wallace & Tiernan Co., Inc. . . . .	XX
		Water Works Engineering . . . . .	XIX



# If you *don't* prescribe Laxative FOODS... your patients will take weakening DRUGS



**I**N THIS DAY of constipating diets and sedentary lives, a large percentage of people suffer from intestinal stasis. Headaches and other discomforts naturally result. To secure relief, people all too often resort to various laxative drugs, which, when frequently used, are usually irritating and weakening.

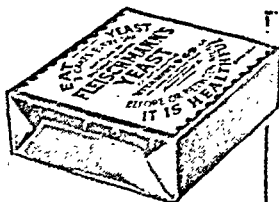
Many doctors now save their patients from the effects of the repeated use of drugs. They simply recommend that Fleischmann's Yeast be added to the diet. This food has a gentle laxative action. It does not "gripe" or irritate. The effect of its continued use is to *strengthen*

instead of weaken the intestinal muscles.

In addition to this cleansing property, Fleischmann's Yeast is very rich in three vitamins—VITAMINS B, G and D. It adds to the nutrition and well-being of the patient in many ways.

Fleischmann's fresh Yeast is available to all your patients. Recommend that they make use of it. Optimal benefits follow the regular eating of three cakes a day, a cake before each meal, or between meals and at bedtime, plain or dissolved in a third of a glass of water.

**A corrective  
food...  
very rich in  
Vitamins B, G, D**



Health Research Dept. MI-9, Standard Brands Inc.  
691 Washington St., New York City  
Please send me new edition of "Yeast Therapy,"  
based on the findings of noted investigators.

Name

Address

Copyright, 1933, Standard Brands Incorporated

When writing to Advertisers, say you saw it in the JOURNAL

# American Journal of Public Health

## and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

October, 1933

Number 10

### CONTENTS

	PAGE
Radium Poisoning: A Review of Present Knowledge . . . . . <i>Robley D. Evans, Ph.D.</i>	1017
Mechanism of Infection in Poliomyelitis . . . . . <i>Harold K. Faber, M.D.</i>	1024
Natural and Induced Variations in the Vitamin Values of Milk . . . . . <i>H. C. Sherman</i>	1031
Toxic Amblyopia and Accompanying Physiological Disturbances in Carbon Tetrachloride Intoxication . . . . . <i>Zolton T. Wirtschafter, M.D.</i>	1035
"Food-Poisoning"—A Public Health Problem . . . . . <i>J. C. Geiger, M.D., and J. P. Gray, M.D.</i>	1039
Ten Years of Public Health Administration in Ohio . . . . . <i>Robert G. Paterson, Ph.D.</i>	1045
Industrial Dermatitis in the United States . . . . . <i>Louis Schwartz, M.D.</i>	1049
Letter to the Editor— <i>G. M. Mackenzie, M.D.</i> . . . . .	1055

### EDITORIAL SECTION

Encephalitis in St. Louis . . . . .	1058
Vitamin D Milk and the Health Officer . . . . .	1060

*Continued on page vi*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

# Is It Advertised

*in the*

## AMERICAN JOURNAL of PUBLIC HEALTH?

“Has the American Public Health Association ever accepted for advertising in the Journal such and such an article or product?” is a question frequently asked, the assumption being that products, equipment and services advertised in the American Journal of Public Health are safe to buy, prescribe, specify or recommend.

The assumption often is that aids to health protection and promotion not appearing in the Journal are not worthy of professional support.

Health authorities appreciate that manufacturers and distributors marketing the things used in modern health work have helped immeasurably in disease prevention and health building. Not all such things are advertised in the Journal, but health workers are right in using its advertising pages as their first guide. When the answer to the question “Is it advertised in the Journal?” is “Yes,” then that advertiser should be patronized. It is only fair that readers should give preference in their buying to the advertisers who are supporting their magazine.

It is fair, too, to let Journal advertisers know that their announcements are read, and that they influence readers to buy.

It is not safe to neglect the advertising pages of the Journal. New products of public health significance are being developed constantly, many of them evolving as the commercial applications of scientific discoveries made by members of this Association.

The urgent recommendation is made that the advertising pages be scanned with care month by month, and that the advertisers be made aware of the interest of readers in correspondence and in patronage.

This practice can result in nothing but good for the public health worker, the advertiser and the Journal.

**The American Public Health Association**  
450 Seventh Avenue New York, N. Y.

	PAGE
Association News . . . . .	1063
Entertainment and Inspection Trips in Indianapolis. New Members. Deceased Members. Back Numbers of the Journal Needed. Correction.	
Public Health Administration— <i>Henry F. Vaughan, Dr.P.H., and Ira V. Hiscock</i> . . . . .	1066
Pittsburgh, Pa. New Haven, Conn. Shorewood, Wis. Diphtheria Protection in New York. Hygienic Institute.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . . .	1067
Antigenic Value of Commercial Diphtheria Toxoids— <i>William Levin, Dr.P.H., and Helen A. Cary, M.D.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . . .	1072
Vital Statistics for Canada, 1932. Births by Nativity of Mother in Pennsylvania in 1932. Scottish Vital Statistics for 1932. Where and How Men Get Hurt. Vital Statistics Records for New Jersey for 1932.	
Public Health Engineering— <i>Arthur P. Miller, C.E.</i> . . . . .	1075
A Hypochlorite Feeding Device— <i>Frank R. Shaw, Robert W. Kehr, and Edwin T. Matthews.</i>	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . . .	1081
Dr. J. A. Orenstein Honored. Incidence of Illness Among Male Industrial Employees in 1932 as Compared with Earlier Years. Correspondence Committee on Industrial Hygiene. Health Hazard from Dust in the Mines and Allied Industries of the United States, Initial Survey of the Extent and Severity. The Size Frequency of Industrial Dusts. Some Common Industrial Health Hazards. The Silica Content of Lungs. Review of Silicosis. Court Decisions. Compensation for Silicosis. Bite by Infected Wood Tick Held Compensable. Workmen's Compensation Act Held Not to Take Away Right of Action for Noncompensable Disease Caused by Employer's Negligence. Occupational Dermatitis and Compensation. What Determines Compensability for Skin Diseases Among Industrial Workers? Compensation for Occupational Diseases in Denmark. A Modern Plan for a Community Campaign Against Air Pollution. Temperature Gradient Observations in a Large Heated Space. Zinc in Relation to General and Industrial Hygiene. Lead Absorption and Compensation.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	1088
Microbiology of Frozen Foods—VI, The Survival of Pathogenic Microorganisms in Ice Cream. The Vitamin B and G Content of Wheat Germ, Rice Polishings, Cottonseed Flour and the Residue from Fermented Rye Flour. Vitamin C Content of Baldwin Apples and Apple Products. The Iodine Content of Hens' Eggs as Affected by the Ration. Specificity of Hexuronic (Ascorbic) Acid as Antiscorbutic Factor.	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	1091
Effects of Unemployment on Children and Young People in Belgium.	

Continued on page viii

Reprint prices furnished upon request

# Every expectant and nursing mother needs this vitamin

—yet note its scarcity in all these foods

PERHAPS more than any other element, expectant and nursing mothers need vitamin D. Without it, the bone-building calcium and phosphorus in their food cannot be properly utilized.

Even a "varied" diet, however, fails to supply *enough* vitamin D. Only four common foods contain more than a trace of this vitamin, and even three of these in undependable amounts. And the body cannot store for long the small amounts absorbed from limited exposure to the summer sun.

Therefore, it is not enough to prescribe foods rich in phosphorus and calcium. Special measures are needed to provide vitamin D *as well*.

An easy way is to add Fleischmann's fresh Yeast to the diet. Now "irradiated," each cake contains 60 Steenbock vitamin D units—the equivalent of a full teaspoonful of standard cod liver oil.

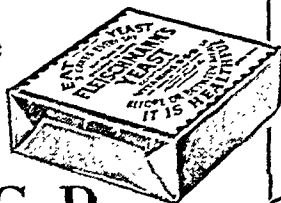
Fleischmann's Yeast is also very rich in vitamins B and G—very important in pregnancy and lactation—and has a gentle laxative effect and general tonic action on the system as well.

Simply recommend three cakes a day.

FOOD	VITAMIN D
<b>VEGETABLES</b>	
Asparagus	0
Beans, Lima	0
Beans, String	0
Beets	0
Cabbage	0
Carrots	0
Celery	0
Lettuce	0
Potatoes	0
Spinach	0
<b>FRUITS</b>	
Apples	0
Bananas	0
Grapefruit	0
Lemon juice	0
Orange juice	0
Pineapple	0
Prunes	0
<b>MEATS AND FISH</b>	
Meat	0
Liver	0
Fish (Average)	Trace
Fish (Fatty)	XXX
Oysters	Trace
<b>DAIRY PRODUCTS</b>	
Butter	X Var.
Buttermilk	0
Cheese	0
Milk	X Var.
Eggs (Yolk)	XX Var.
<b>CEREALS</b>	
Barley	0
Oatmeal	0
Bread (Regular)	0
Rice	0

Chart shows why most expectant and nursing mothers don't get enough vitamin D from their food.

A corrective food... very rich in Vitamins B, G, D



Health Research Dept. MI-10  
Standard Brands Inc.

691 Washington St., New York City.

Please send me new edition of "Yeast Therapy," based on the findings of noted investigators.

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1933, Standard Brands Incorporated

When writing to Advertisers, say you saw it in the JOURNAL

Contents—Continued

	PAGE
Public Health Nursing— <i>Eva F. MacDongall, R.N.</i> . . . . .	1093
Echoes from the I. C. N. The Public Health Nurse and the Federal Government. Two of Our Nursing Leaders Are Doing Their Bit. Good for New Mexico!	
Education and Publicity— <i>Evart G. Routzahn</i> . . . . .	1095
Education and Publicity Headquarters. Surely People Are Making Wills. Have You a List for Indianapolis? The Psychology of Health Education. Too Many Ideas on the Air? Are Radio Talks Too Casually Presented? Is "Per Capita" Convincing? Health Education. We Should Know Them. A Use for Your Photographs. The "Women's Crusade" for Human Needs. Why Not? Health Advice in Newspapers. In Hygeia for September, 1933. Educational Material. Schools and Children. Plays. Magazine Articles. You May be Interested.	
Books and Reports . . . . .	1103
Tuberculous Disease in Children: Its Pathology and Bacteriology. A Standard Classified Nomenclature of Disease. The History and Epidemiology of Syphilis. Cancer and Other Chronic Diseases in Massachusetts. The Sanitary Inspector's Handbook: A Manual for Sanitary Inspectors and Other Executive Public Health Officers. Everyday Problems in Health. The Health School on Wheels. Infants and Children: Their Feeding and Growth. A Study of Rural Public Health Services.	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	1110
Books Received . . . . .	1112
News from the Field . . . . .	1113
Conferences . . . . .	1114

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A. . . . .	X	Directory of Health Service . . . . .	XXII
Book Service . . . . .IX, XII, XIII, XIV, XV		Committee on Administrative Practice, A.P.H.A.	
Directory of Exhibits, Annual Meeting, Indianapolis . . . . .	XX, XXI	Remington Rand, Inc.	
Employment Service . . . . .	XXIV	Eastman Kodak Company . . . . .	XXII
Membership Application Form . . . . .	XVIII	Eimer & Amend, Inc. . . . .	XIX
Second Institute on Health Education, Annual Meeting, Indianapolis . . . . .	II	Fleischmann's Yeast . . . . .	V
Southern Branch, A.P.H.A., Proceedings of . . . . .	XXV	General Laboratories, Inc. . . . .	XI
Affiliated Societies . . . . .	XII	Gilliland Laboratories, Inc., The . . . . .	VII
American Journal of Nursing, The . . . . .	XIII	Hynson, Westcott & Dunning . . . . .	VII
Canadian Public Health Journal . . . . .	XIX	Johns Hopkins University, The . . . . .	XIII
Cereal Soaps Co., Inc. . . . .	1114	Journal of Dairy Science . . . . .	XXIII
Derbac . . . . .	1114	Journal of Home Economics . . . . .	1114
Difco Laboratories . . . . .	Back Cover	Kellogg & Company . . . . .	1114
Directory of Health Service . . . . .	XXII	Medical and Professional Woman's Journal, The . . . . .	XXIII
American Water Works Association		Municipal Sanitation . . . . .	XIII
Bendiner & Schlesinger		Science Leaflet, The . . . . .	XIV
Black & Veatch		Standard Brands, Inc. . . . .	V
		Trained Nurse, The . . . . .	XI
		Wallace & Tiernan Co., Inc. . . . .	XVI

... Announcing ...  
 Alum Precipitated  
 DIPHTHERIA TOXOID  
 (Gilliland)

*Single Injection*

The superior immunizing value and the higher percentage of immunity following the use of a single injection of Alum Precipitated Toxoid has been demonstrated.

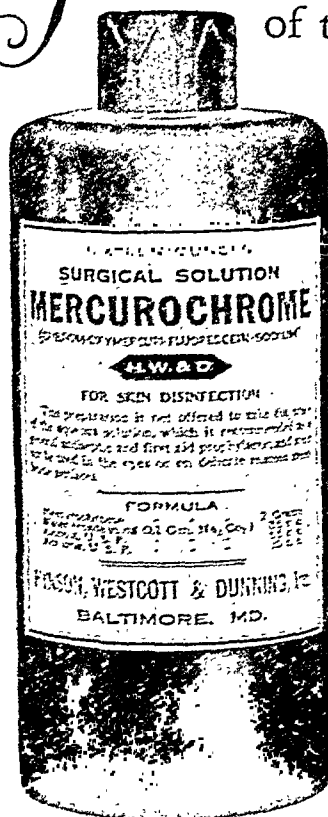
*J. A. M. A.*, 100:14, Apr. 8, 1933; *J. Med. Assoc. State of Ala.*, 2:8, Feb., 1933.

Supplied in packages sufficient for One, Ten and Fifteen Treatments.

*Additional Information and Prices on Request*

The Gilliland Laboratories, Marietta, Pa.

*Seven Years' Use* has demonstrated the value  
 of the SURGICAL SOLUTION of  
**Mercurochrome** H.W. & D.  
 in Preoperative Skin Disinfection



THIS preparation contains 2% Mercurochrome  
 in aqueous-alcohol-acetone solution and has  
 the advantages that:

*Application is not painful.*

*It dries quickly.*

*The color is due to Mercurochrome and  
 shows how thoroughly this antiseptic agent  
 has been applied.*

*Stock solutions do not deteriorate.*

Now available in 4, 8, and 16 oz. bottles and  
 in special bulk package  
 for hospitals.

*Literature on request*

This seal denotes acceptance of  
 Mercurochrome for New and  
 Nonofficial Remedies by the  
 Council on Pharmacy and  
 Chemistry of the American  
 Medical Association.



**Hynson, Westcott & Dunning, Inc.**  
 BALTIMORE, MARYLAND

# Clinical on Dietary Control

## GINGIVITIS

1st year (standard diet), incidence . . . . .	<b>74.9%</b>
2nd year (standard diet + citrus fruit juices) .	<b>12.4%</b>
3rd year (standard diet, recheck period) . .	<b>60.3%</b>

## DENTAL CARIES

1st year (standard diet), incidence . . . . .	<b>78.0%</b>
2nd year (standard diet + citrus fruit juices) .	<b>33.7%</b>
3rd year (standard diet, recheck period) . .	<b>83.4%</b>

*Three and a half year study of 440 Mooseheart children by The Sprague Memorial Institute at the University of Chicago shows citrus fruit juices to be an important nutritional factor in the control of gingivitis and of dental caries*

**D**EFINITE progress in establishing the exact relationship between diet and dental disorders is reported in "Diet and Dental Health," a monograph soon to be published by University of Chicago Press.

Following one year each of clinical control and test periods and one and a half years of recheck, these conclusions were reached:

### *Standard Diet Inadequate*

"1. The average American diet is adequate in calories but appears to be deficient in certain substances that are requisite to dental health. This dietary deficiency may be the ultimate cause of much of the gingivitis, pyorrhea and dental caries with which we are afflicted.

"2. Gingivitis and dental caries can occur in the majority of a large group of children who are receiving a quart of milk, one and one-half ounces of butter, a pound of vegetables, half a pound of fruit and nearly one egg a day. These foods do not, therefore, contain substances that are specifically antagonistic to gingivitis or dental caries.

### *Citrus Fruits Effective*

"3. The addition of a pint of orange juice and the juice of one lemon to a diet that is nearly adequate in all other re-

spects supplies something that leads to a disappearance of most of the gingivitis and an arrest of about 50% of the dental caries.

### *Three Ounces Not Enough*

"4. Dental caries again becomes rampant and gingivitis redevelops in most of the cases when the citrus fruit intake is reduced to three ounces a day for one year. Three ounces is not enough.

"5. Children display a definite tendency toward the development of carious lesions which is nil or low in some cases and high in others. This tendency can, perhaps, be ascribed to heredity. The administration of an adequate amount of citrus fruit juice to a diet that is nearly adequate in other respects reduces the intensity of the carious process; but does not completely remove the effects of the inherent tendency in all cases.

### *Growth Accelerated*

"6. Orange and lemon juice contain something that acts as a growth stimulus to children."

### *How Study Was Begun*

The study culminating in these conclusions was undertaken after preliminary work by Dr. Milton T. Hanke, Associate Professor of Biochemistry in the Department of Pathology, and a member of The Sprague Memorial Institute at the University of Chicago, in collaboration with the members

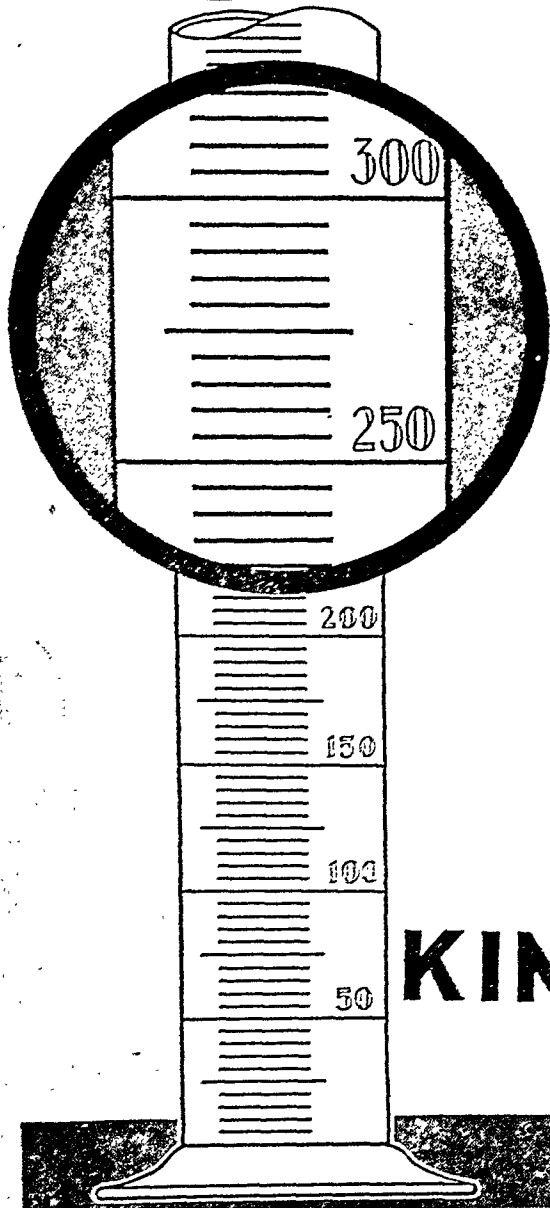
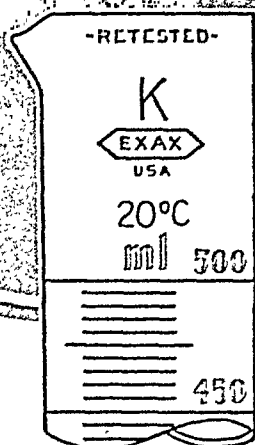


CALIFORNIA FRUIT GROWERS EXCHANGE...Marketers of...



# BLUE LINE EXAX CYLINDERS

*for Assurance*



THE graduated cylinder is one of the mainstays in scientific laboratory work. Its calibration must be accurate if results are to be relied upon. Kimble Blue Line Exax Cylinders—blown in paste moulds to produce a highly polished surface—permit reading of all liquid levels without error or distortion.

## IMPORTANT FEATURES

1. Each cylinder is calibrated at 20°C at enough points to assure accuracy of intermediate divisions.
2. Lining and numbering are done by automatic machines.
3. All lines are deeply acid-etched and filled with a durable blue glass enamel, actually fused in.
4. An entirely new type of calibration lining for accurate and rapid reading. Short lines for intermediate divisions with encircling lines at the main graduation points.
5. All Kimble Blue Line Exax Cylinders are retested, and are retempered (strain-free) to eliminate weak spots.
6. The lips are finished so that liquid can be poured slowly without running down the sides.
7. All bottoms are ground so as to rest perfectly level.

The following tolerances are allowed:

5 ml.	±0.10 ml.	250 ml.	±1.4 ml.
10 ml.	0.10 ml.	500 ml.	2.6 ml.
25 ml.	0.30 ml.	1000 ml.	5.0 ml.
50 ml.	0.40 ml.	2000 ml.	10.0 ml.
100 ml.	0.60 ml.		

Stocked by leading Laboratory Supply Houses throughout the United States and Canada.

# KIMBLE GLASS COMPANY



VINELAND, NEW JERSEY.  
NEW YORK • PHILADELPHIA • BOSTON  
CHICAGO • DETROIT

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

November, 1933

Number 11

## CONTENTS

	PAGE
America's Contributions and Problems in Public Health . . . . .	1115
Presidential Address	
<i>John A. Ferrell, M.D., Dr.P.H.</i>	
Committee on Professional Education . . . . .	1124
<i>W. S. Leathers, M.D., Chairman</i>	
The Work of Walter Reed and His Associates of the Medical Department of the United States Army . . . . .	1127
<i>Major General Robert U. Patterson</i>	
Epidemic Encephalitis Symposium:	
The Story of the Epidemic of Encephalitis in St. Louis . . . . .	1135
<i>Joseph F. Bredeck, D.P.H.</i>	
Epidemiology of Encephalitis—With Special Reference to the 1933 Epidemic . . . . .	1140
<i>James P. Leake, M.D.</i>	
Types of Epidemic Encephalitis—A Comparison of the Cases Seen in St. Louis in 1933 with Those Seen in New York City . . . . .	1144
<i>Josephine B. Neal, M.D.</i>	
Discussion— <i>Ralph S. Muckenfuss, M.D.</i> . . . . .	1148
<i>Theodore C. Hempelmann, M.D.</i> . . . . .	1149
<i>Howard Anderson McCordock, M.D.</i> . . . . .	1152
<i>Thomas M. Rivers, M.D.</i> . . . . .	1153
Production of Antitoxins by Means of Bacteriophage . . . . .	1155
<i>N. W. Larkum, Ph.D.</i>	
The Need of an Index Statisticus . . . . .	1159
<i>A. W. Hedrich, Sc.D.</i>	
"Missed" Epidemics of Septic Sore Throat . . . . .	1165
<i>Paul B. Brooks, M.D.</i>	

*Continued on page viii*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

# Evidence of Dental Disorders

## HEIGHT GAIN (BOYS)

1st year (standard diet),  
av. gain, 13-yr. group **1.6 in.**

2nd year (standard diet  
+ citrus fruit juices) **2.8 in.**

3rd year (standard diet,  
recheck period) **2.5 in.**

## WEIGHT GAIN (BOYS)

1st year (standard diet),  
av. gain, 13-yr. group **8 lb.**

2nd year (standard diet  
+ citrus fruit juices) **15 lb.**

3rd year (standard diet,  
recheck period) **12½ lb.**

*Exhaustive monograph lists complete diets used in the most comprehensive clinical nutritional study of children on record—permitting correlations for various purposes.*

*This Advance Edition now offered at special pre-publication price of one dollar*

of the Chicago Dental Research Club. Upon the suggestion of this group and The Sprague Memorial Institute, the California Fruit Growers Exchange agreed to furnish fruit and additional funds to guarantee the completion of the research.

The California Fruit Growers Exchange also made available to the University of Chicago Press the forty-eight costly color engravings and other plates, which illustrate this monograph. This makes it possible for the Special Advance (\$1.) Edition to contain the identical full color illustrations that will be used in the regular \$4. edition.

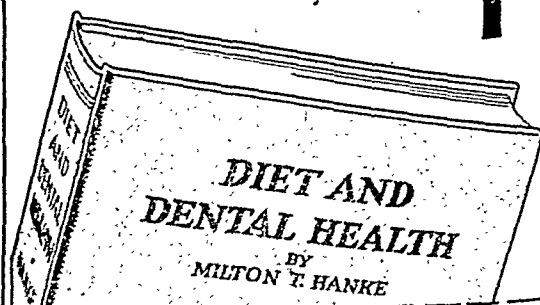
### Nutritionists: Send For Book

Nutritionists and Physicians, as well as Dentists, will find much of the clinical material in "Diet and Dental Health" directed to them. Tables give precise data, such as serum calcium, oral bacteriology, etc., on all children included in the three and a half year Mooseheart study group. This permits correlations for various purposes. The Mooseheart research is easily the most comprehensive clinical nutritional study of children on record. Only a limited number of subscriptions for the monograph can be made available to the professions at \$1., and an early return of the coupon and remittance is urged.

Copr., 1933, California Fruit Growers Exchange

## 350 PAGES

48 pages of illustration chiefly of actual color photographs. Pre-publication offer: Special Advance Edition durably bound \$1



UNIVERSITY OF CHICAGO PRESS, Div. 1011-E  
5750 Ellis Avenue, Chicago, Illinois

Enter my order for "Diet and Dental Health,"  
at the pre-publication price of ONE DOLLAR.  
I enclose ☐ money order, ☐ check, ☐ currency.

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Sunkist Oranges..Lemons..Grapefruit

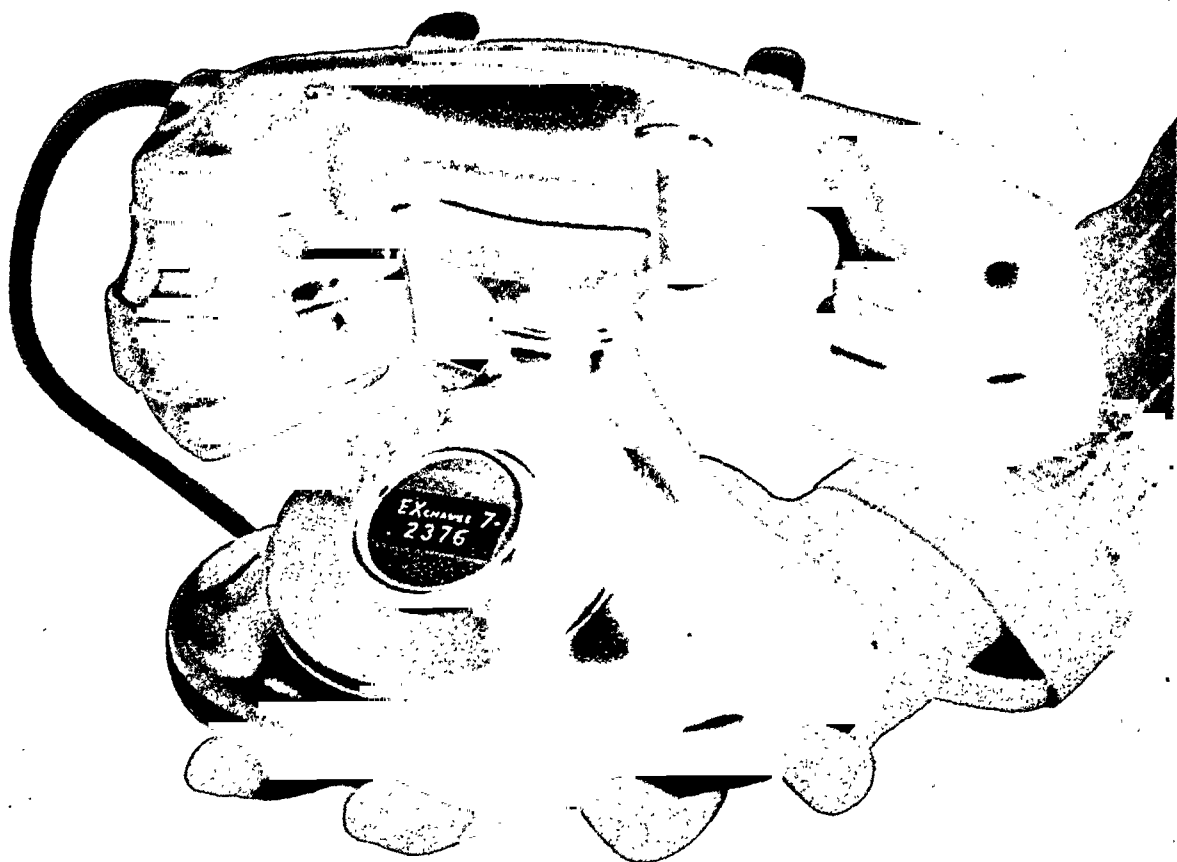
# EDITORIAL SECTION

	PAGE
The Sixty-Second Annual Meeting . . . . .	1168
Depression and Health in England . . . . .	1170
Tubercle Bacilli from the Blood Stream . . . . .	1171
Letter from Great Britain— <i>Charles Porter, M.D.</i> . . . .	1172
Association News . . . . .	1175
The Sixty-Third Annual Meeting A.P.H.A. to Be Held Jointly with Fifth Annual Meeting Western Branch. New Officers of A.P.H.A. Second Institute on Health Education. Notice to Members Applying for Fellowship. Honorary Fellow and Life Members Elected at Indianapolis. New Members. Errors and Omissions in Standard Methods for the Examination of Water and Sewage.	
Public Health Administration— <i>Henry F. Vaughan, Dr.P.H., and Ira V. Hiscock</i> . . . . .	1180
Extension Course for Health Officers. Tuberculosis Service in Metropolitan New York. East Orange, N. J. Typhoid Carriers in New York State. Duties of Health Commissioners. Hamilton, Ont. Cambridge, Mass.	
Laboratory— <i>John F. Norton, Ph.D.</i> . . . .	1182
Preservation of Milk Samples with Brilliant Green for Streptococcus and Abortus Examination— <i>C. S. Bryan.</i>	
Automatic Pipette Washer— <i>Ellen Howell and Fannie Mae Frank.</i>	
Vital Statistics— <i>Louis I. Dublin, Ph.D.</i> . . . .	1186
Mortality Statistics in the Death Registration Area of Continental United States, 1930, 1931, 1932. The Incidence of Endemic Goiter in Northeastern Germany. Infant Mortality in Pennsylvania in 1932. Marriage and Divorce in Wisconsin in 1932.	
Industrial Hygiene— <i>Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D.</i> . . . .	1191
The Pathologic Reactions in Various Pneumoconioses. Etiology of Silicosis. The Clinical Manifestations of Silicosis. Fundamentals of Asphyxia. Occupational Anthrax Reported in Germany. Silicon Dioxide Content of Lungs in Health and Disease. Roentgenologic Aspects of Pneumoconiosis and Its Differential Diagnosis. The Radiologic Recognition of Heart Disease in Pneumoconiosis.	
Food and Nutrition— <i>Walter S. Frisbie</i> . . . . .	1194
Vitamin C Content of Strawberries, and Strawberry Ice Cream. Studies on the Rôle of Zinc in Nutrition. Vitamin Studies VI—Influence of Fertilizers on the Vitamin C Content of Spinach. Comparative Effect of Tomato and Orange Juices on Urinary Acidity. The Calcium Retention on a Diet Containing Leaf Lettuce. Vitamins C and A in Blueberries. Vitamin A Content of Milk Irradiated by Various Carbon Arcs.	
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . .	1198
Child Health and Child Welfare in England— <i>Richard A. Bolt, M.D., Dr.P.H.</i>	
Classes for Expectant Fathers— <i>Eldred V. Thichoff, M.D.</i>	

Continued on page x

Reprint prices furnished upon request

# "WHERE TO, PLEASE?"



SCARCELY a day passes—sometimes scarcely an hour in the day—that you do not go visiting by telephone. It is truly the magic carpet that transports you, quickly and easily, to places you would like to be and people you would like to see.

Who can estimate the value of the telephone in the daily lives of millions of men and women . . . in time and money saved, in increased efficiency, in security and priceless help in time of need!

Contact, communication, swift interchange of ideas—these

benefits the modern world offers you. The telephone is one of the chief instruments by which you can seize them. With it at your elbow you are ready for what may come—for opportunity, for emergency, for the brief word that may open a fresh chapter in your life.

Within the next twenty-four hours, sixty million telephone calls will be made over Bell System wires—each a separate, individual transaction, complete in itself. Yet your own calls will go through as quickly and efficiently as if the entire system had been built especially for you.



AMERICAN TELEPHONE AND TELEGRAPH COMPANY

When writing to Advertisers, say you saw it in the JOURNAL

Contents—Continued

	PAGE
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	1202
A School Nurse's Letter and Our Reply. Public Health Nurses as Home Hygiene Teachers. Federal Funds for Visiting Nursing.	
Education and Publicity— <i>Ewart G. Rontzahn</i> . . . . .	1204
Health Department Leadership This Fall. United We Stand—And Go Forward. Letters to Editors Will Help. How It Looks to Them. Radio Coöperation. Local Motion Picture Clinics. Planned Objectives for Literature Distribution. Reporting via Mimeograph. Hygeia for October, 1933. A Health Education Exhibit. To Editors of Health Bulletins and Magazines. For Camp, Club, or Institution. Professionals as Volunteers. It May Be Here. Magazine Articles.	
Books and Reports . . . . .	1211
Health and Environment. Social Planning and Adult Education. Water Pageants, Games and Stunts. The Control of Football Injuries. Procedures in Tuberculosis Control for the Dispensary, Home and Sanatorium. Proceedings of Southern Branch of the American Public Health Association, Held at Birmingham, Alabama, November 14, 15, 16, 1932. What Shall I Eat? Dictionary for Nurses (2d ed.). Nutrition. Milk, the Indispensable Food. Children's Sleep. The Common Cold. Selected Recreational Sports (for Girls and Women). Abderhalden's Handbuch der Biologischen Arbeitsmethoden, Vol. XIII. The First Two Years: A Study of Twenty-Five Babies—Volume II, Intellectual Development. The Tides of Life: The Endocrine Glands in Bodily Adjustment.	
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . . .	1219
Books Received . . . . .	1220
News from the Field . . . . .	1221
Conferences . . . . .	1222

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A.		Directory of Health Service.....	XXII
Book Service . . . . .	XII, XIV, XVIII, XXIII	Pease Laboratories, Inc.	
Disease Charts . . . . .	XXI	Remington Rand, Inc.	
Health Bulletin Service.....	XXI	Eastman Kodak Company.....	XVII
Membership Application Form.....	XX	Fleischmann's Yeast . . . . .	IX
Affiliated Societies . . . . .	XII	Gilliland Laboratories, Inc., The.....	XIII
American Journal of Cancer.....	XIX	Hynson, Westcott & Dunning.....	XIII
American Journal of Nursing, The.....	XVIII	International Equipment Company.....	XV
American Telephone & Telegraph Company	VII	Journal of Dairy Science.....	XIV
California Fruit Growers Exchange.....	IV, V	Kellogg & Company.....	II
Canadian Public Health Journal.....	XIX	Kimble Glass Company.....	III
Cereal Soaps Co., Inc.....	1222	Municipal Sanitation . . . . .	XVIII
Derbac . . . . .	1222	Squibb & Sons, E. R.....	XI
Difco Laboratories . . . . .	Back Cover	Standard Brands, Inc.....	IX
Directory of Health Service.....	XXII	Trained Nurse, The.....	XV
American Water Works Association		Wallace & Tiernan Co., Inc.....	XVI
Bendiner & Schlesinger		Water Works Engineering.....	XVIII
Black & Veatch			

## SINCE THEY WON'T TAKE EXERCISE THEY MUST TAKE LAXATIVES...



## Prescribe this laxative FOOD instead of weakening DRUGS

PEOPLE refuse to adapt their dietary to their sedentary ways of living. And they cannot or *will* not exercise enough to enable their systems to eliminate the constipating foods they indulge in. So naturally a large number suffer from constipation and attendant ills.

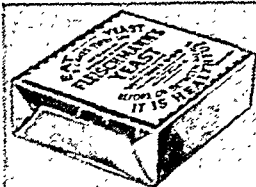
Left to their own devices, people usually resort to laxative drugs which often are drastic and irritating in their action and frequently have a weakening effect over a period of time.

This objection is not true of Fleischmann's Yeast. It is a *food*, with very valuable corrective properties. It does not "gripe" or irritate. It is not habit

forming. It has a gentle cleansing effect. It softens impacted masses and when used regularly *strengthens* the intestinal muscles.

Fleischmann's Yeast is at least a partial substitute for exercise and sunshine. It provides the laxative effect which exercise gives. It supplies the "sunshine" vitamin D. In addition, it is extremely rich in vitamins B and G.

Advise your patients to make use of this food. Simply recommend three cakes a day—before meals, or between meals and at bedtime—plain, or dissolved in a third of a glass of water.



**A corrective  
food...  
very rich in  
Vitamins B, G, D**

Health Research Dept. MI-11, Standard Brands Inc.  
691 Washington St., New York City

Please send me new edition of "Yeast Therapy,"  
based on the findings of noted investigators.

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1933, Standard Brands Incorporated

# Gingivitis and Controlled by Diet in

*Dental disorders of 440 Mooseheart children respond  
to daily ingestion of fresh orange and lemon juice*

## Results in Brief:

### GINGIVITIS

1st year (standard diet), incidence . . . . .	<b>74.9%</b>
2nd year (standard diet + citrus fruit juices) .	<b>12.4%</b>
3rd year (standard diet, recheck period) . .	<b>60.3%</b>

### DENTAL CARIES

1st year (standard diet), incidence . . . . .	<b>78.0%</b>
2nd year (standard diet + citrus fruit juices) .	<b>33.7%</b>
3rd year (standard diet, recheck period) . .	<b>83.4%</b>

### GROWTH (BOYS)

	Height Inches	Gain Inches	Weight Gain lbs.
1st year (standard diet), av. gain, 13-yr. group	<b>1.6</b>	<b>8</b>	
2nd year (standard diet + citrus fruit juices)	<b>2.8</b>	<b>15</b>	
3rd year (standard diet, recheck period) . .	<b>2.5</b>	<b>12½</b>	



CALIFORNIA FRUIT GROWERS EXCHANGE...Marketers of...

"THE addition of a pint of orange juice and the juice of one lemon to a diet that is nearly adequate in all other respects supplies something that leads to a disappearance of most of the gingivitis and an arrest of about 50% of the dental caries."

This is one of the conclusions announced in "Diet and Dental Health," a monograph published by the University of Chicago Press. It reports the results of a three and one-half year study made at Mooseheart by The Sprague Memorial Institute at the University of Chicago.

#### American Diet Deficient

"The average American diet," the conclusions also state, "is adequate in calories but appears to be deficient in certain substances that are requisite to dental health. This dietary deficiency may be the ultimate cause of much of the gingivitis, pyorrhea and dental caries with which we are afflicted."

"Gingivitis and dental caries can occur in the majority of a large group of children who are receiving a quart of milk, one and one-half ounces of butter, a pound of vegetables, half a pound of fruit and nearly one egg a day. These foods do not, therefore, contain substances that are specifically antagonistic to gingivitis or dental caries."

#### Ample Citrus Fruit Juice Required

"Dental caries again becomes rampant and gingivitis redevelops in most of the cases when the citrus fruit intake is reduced to three ounces a day for one year. Three ounces is not enough."

"Children display a definite tendency toward the development of carious lesions which is nil or low in some cases and high in others. This



# Entirely lacking in most foods...

the vitamin most needed in Pregnancy

**Y**ou know the importance of vitamin D during pregnancy and lactation... without it the mother cannot properly absorb and utilize the calcium and phosphorus in her food—cannot adequately replace the phosphorus and calcium drawn from her own bone and tooth structure.

But do you realize the *scarcity* of this vitamin? There is no vitamin D in fruits and vegetables. Only *four* common foods contain more than a trace... milk, butter, eggs and fatty fish, and in the first three of these it is decidedly variable. And the body cannot long store the small amounts it may absorb from limited exposure to the summer sun.

Hence it is not enough to prescribe foods rich in phosphorus and calcium. Special provision should *also* be made for a regular supply of vitamin D.

Many doctors make such provision by prescribing three cakes of Fleischmann's Yeast daily. Now specially "irradiated," each cake has a potency of 60 Steenbock vitamin D units—the equivalent of a full teaspoonful of standard cod liver oil.

In addition, Fleischmann's Yeast is very rich in vitamins B and G, so necessary for their influence on the mother's digestion and the growth of the nursing child. And Fleischmann's Yeast is, of course, gently laxative.

Recommend 3 cakes a day, before each meal—dissolved in water, milk or fruit juice.

FOOD	VITAMIN D
<b>VEGETABLES</b>	
Asparagus	0
Beans, Lima	0
Beans, String	0
Beets	0
Cabbage	0
Carrots	0
Celery	0
Lettuce	0
Potatoes	0
Spinach	0
<b>FRUITS</b>	
Apples	0
Bananas	0
Grapefruit	0
Lemon juice	0
Orange juice	0
Pineapple	0
Prunes	0
<b>MEATS AND FISH</b>	
Meat	0
Liver	0
Fish (Average)	Trace
Fish (Fatty)	XXX
Oysters	Trace
<b>DAIRY PRODUCTS</b>	
Butter	X Var.
Buttermilk	0
Cheese	0
Milk	X Var.
Eggs (Yolk)	XX Var.
<b>CEREALS</b>	
Barley	0
Oatmeal	0
Bread (Regular)	0
Rice	0

Chart explains why most expectant and nursing mothers do not get enough vitamin D. Only four common foods contain more than a trace. Its *richest* food source is now Fleischmann's fresh Yeast.



**A corrective  
food...  
very rich in  
Vitamins B, G, D**

Health Research Dept. MI-12, Standard Brands Inc.  
691 Washington St., New York City

Please send me new edition of "Yeast Therapy,"  
based on the findings of noted investigators.

Name \_\_\_\_\_

Address \_\_\_\_\_

Copyright, 1935, Standard Brands Incorporated

When writing to Advertisers, say you saw it in the JOURNAL

# American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXIII

December, 1933

Number 12

## CONTENTS

	PAGE
The Physician and Public Health Officialdom . . . . . <i>Morris Fishbein, M.D.</i>	1223
Proposed Federal Food and Drugs Act—Its Public Health Features . . . . . <i>Walter S. Frisbie</i>	1232
The Roentgenogram in So-Called "Acute" Silicosis . . . . . <i>Homer L. Sampson</i>	1237
Pathology of So-Called Acute Silicosis . . . . . <i>Leroy U. Gardner, M.D.</i>	1240
The Silica Content of the Lungs of a Group of Tunnel Workers . . . . . <i>Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D.</i>	1250
Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools . . . . . <i>A. H. Fletcher and E. C. Link</i>	1255
Hemolytic Properties of the Mastitis Streptococcus . . . . . <i>P. Arne Hansen, G. J. Hucker, Ph.D., and Marion A. Snyder</i>	1262
Outbreak of Erythema Infectiosum in Elmsford, N. Y. . . . . <i>Phyllis Schuyler Kerr, M.D., and Edward H. Marsh, M.D., Dr.P.H.</i>	1271
Pulmonary Asbestosis . . . . . <i>J. Donnelly, M.D.</i>	1275
Has Diabetes Become More Prevalent? . . . . . <i>Charles Bolduan, M.D.</i>	1282
Significance of Copper and Iron in Blood Restoration . . . . . <i>C. A. Elvehjem, Ph.D.</i>	1285

*Continued on page viii*

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.  
Business Office, 450 Seventh Avenue, New York, N. Y.

NOTICE:—Subscription \$5.00 per year for United States; \$5.50 for Canada, Cuba, and Mexico; and \$6.00 for foreign countries. Single copies, 50 cents postpaid. Copyright, 1933, by American Public Health Association.

Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, M. P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 450 Seventh Avenue, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

# Dental Caries

## 3½-Year Clinical Study

*Nutritionists: Monograph gives full details of the most comprehensive nutritional study of children ever made*

tendency can, perhaps, be ascribed to heredity. The administration of an adequate amount of citrus fruit juice to a diet that is nearly adequate in other respects reduces the intensity of the carious process; but does not completely remove the effects of the inherent tendency in all cases.

### *Rate of Growth Improved*

"Orange and lemon juice contain something that acts as a growth stimulus to children."

### *How Study Was Begun*

This study was the outgrowth of preliminary work by Dr. Milton T. Hanke, Associate Professor of Biochemistry in the Department of Pathology, and a member of The Sprague Memorial Institute at the University of Chicago, in collaboration with the Chicago Dental Research Club.

At the instance of this group and the Institute, the California Fruit Growers Exchange agreed to furnish fruit and additional funds to guarantee the completion of the research.

And for the monograph, the California Fruit Growers Exchange made available to the University of Chicago Press forty-eight costly color engravings and other plates. This makes it possible for the Special Advance (\$1) Edition to contain the identical full-color illustrations to be used in the regular \$4 edition.

### *Nutritionists: Send For Book*

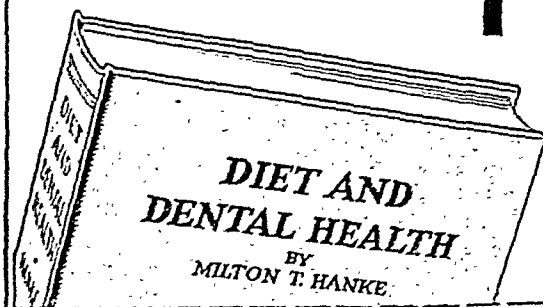
Nutritionists and Physicians, as well as Dentists, will find much of the clinical material in "Diet and Dental Health" directed to them. Tables give precise data, such as serum calcium, oral bacteriology, etc., on all children included in the

three and a half year Mooseheart study group. This permits correlations for various purposes. The Mooseheart research is easily the most comprehensive clinical nutritional study of children on record. Only a limited number of subscriptions for the monograph can be made available to the professions at \$1, and an early return of the coupon and remittance is urged.

Copr., 1933, California Fruit Growers Exchange

## 300 PAGES

48 pages of illustration chiefly of actual color photographs. Pre-publication offer: Special Advance Edition durably bound \$1



UNIVERSITY OF CHICAGO PRESS, Div. 1012-E  
5750 Ellis Avenue, Chicago, Illinois

Enter my order for "Diet and Dental Health,"  
at the pre-publication price of ONE DOLLAR.  
I enclose ☐ money order, ☐ check, ☐ currency.

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

**Sunkist Oranges..Lemons..Grapefruit**

# EDITORIAL SECTION

	PAGE
The Depression and Health Appropriations . . . . .	1290
Doctor Park Not to Retire . . . . .	1293
Amebic Dysentery in Chicago . . . . .	1294
Senate Bill No. 1944 . . . . .	1295
Pasadena in 1934 . . . . .	1296
Association News . . . . .	1298
Haven Emerson, M.D., President—Eugene Lindsay Bishop, M.D., President-Elect: Section Resolutions Adopted at the Indianapolis Annual Meeting—Vital Statistics. Laboratory Letters of Interest from Dr. Wyatt Johnston. New Members.	
Letter to the Editor—Ira V. Hiscock . . . . .	1302
Public Health Administration—Henry F. Vaughan, Dr.P.H., and Ira V. Hiscock . . . . .	1304
Milbank Memorial Fund. Kanawha County, W. Va. Syracuse, N. Y. Montclair, N. J. National Society for the Prevention of Blindness. Ministry of Health, England. Baltimore, Md. Canadian National Committee for Mental Hygiene. Suffolk County, N. Y.	
Laboratory—John F. Norton, Ph.D. . . . .	1310
Rapid Agglutination Technic Applied to B. Pertussis Agglutination—Pearl L. Kendrick, Sc.D.	
Vital Statistics—Louis I. Dublin, Ph.D. . . . .	1312
The Importance of Tuberculosis as a Cause of Death in the Various Age Groups in the Population of Michigan, 1932. Infant Mortality in New Zealand in 1932. Causes of Death in Norway, 1931. Maternal Mortality in England and Wales, 1932.	
Public Health Engineering—Arthur P. Miller, C.E. . . . .	1315
Report of Committee on Scope and Policy—Paul Hansen, Chairman. Report of the Committee on Fellowship and Membership of the Public Health Engineering Section—L. H. Enslow, Chairman.	
Industrial Hygiene—Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D. . . . .	1317
Annual Report, The South African Institute for Medical Research, Year Ended December 31, 1932: Department of Industrial Hygiene, Pathological Department. Ventilation and the Need for New Standards. Law of March 16, 1933, on the Daily Hours in Industrial Establishments.	
Food and Nutrition—Walter S. Frisbie . . . . .	1321
The Escherichia-Aerobacter Group of Bacteria in Dairy Products. Vitamin Tests on California and Asiatic Dates. The Pellagra-Preventive Value of Green Cabbage, Collards, Mustard Greens, and Kale. Effect of Carbon Dioxide and Sodium Benzoate on Vitamin C Content of Orange Juice.	

Continued on page x

Reprint prices furnished upon request

# THE CRISIS IN PUBLIC HEALTH

By

S. WEIR NEWMAYER, M.D.

"It is on this point that the greatest danger exists at the present moment. In many localities the non-presidential year is the time for city elections, and all over the United States at this moment the programs of health and of education are being used as means to attract votes to one side or another. What will happen after the new riders have mounted the horse? Will the vital public health set-up which has protected our millions be permitted to continue or will we have the makeshifts attempted in some localities adopted in many localities? Let us hope that all health activities may remain in full force—that even the most selfish office-holder realizes that there can be no relaxation or compromise in maintaining health. . . . Surely Reconstruction Funds should be spent on medical power and on nurse power to reclaim and improve human beings. 'Life, liberty and the pursuit of happiness' are not only measured in economic projects. Perhaps there are other resources and other workable plans which will forestall that greater crisis, the crippling of public health!"

\* \* \* \* \*

The article from which these are excerpts is a challenge. It should be thoughtfully read by every public health worker and executive.

In the November issue of *The Trained Nurse and Hospital Review* also appear other pertinent public health articles and below:

are Nurses and Physicians Protected Against Tuberculosis?

J. Arthur Myers, Ph.D., M.D., F.A.C.P.

Accomplishments Under a State Emergency Program.

Jennie M. MacMaster, R.N.

Do Parents Guard the Health of the Pre-school Child?

Jane Hashagen, R.N.

Send 35¢ for a copy of the November *Trained Nurse and Hospital Review* or better yet \$3.50 for a year's subscription beginning with this issue. Lakeside Publishing Company, 463 Fourth Avenue, New York City.

(Advertisement)

# B-K HALTS THE SPREAD OF ATHLETE'S FOOT

LABORATORY tests prove that B-K kills instantly on contact the Trichophyton organisms which cause Athlete's Foot . . . that dreaded infection from which it is estimated 90 per cent of college athletes and 50 per cent of our general adult population suffer.

To help prevent the spread of Athlete's Foot, the Committee on Bathing Places of the American Public Health Association recommends the daily use of a hypochlorite solution (such as B-K) to disinfect locker room floors, benches, swimming pool equipment and shower bath floors . . . also for disinfecting the feet after leaving the shower room!

*B-K Now Available in Liquid or Powder Form*

B-K POWDER is more economical and can be added direct to the water for sterilizing and disinfecting, or made into a stock solution and used as per directions for B-K Liquid. Many still prefer B-K Liquid, however, because it provides a dependable ready-made solution at a low price.



For valuable information and consultation on Sanitation and Sterilization \* \* \* write to

**GENERAL LABORATORIES, Inc.**  
Dept. E-12, Widener Bldg., Philadelphia, Pa.

Contents—Continued

	PAGE
Child Hygiene— <i>Richard A. Bolt, M.D., Dr.P.H.</i> . . . . .	1324
A New Ramification of the Dental Problem— <i>John Oppie McCall, D.D.S.</i>	
Public Health Nursing— <i>Eva F. MacDougall, R.N.</i> . . . . .	1326
Public Health Nursing at the Indianapolis A.P.H.A. Meeting.	
Education and Publicity— <i>Ewart G. Routzahn</i> . . . . .	1329
Indianapolis in Retrospect. The "Makings" for Magazine Articles. In Place of a Speech. Objectives in Cancer Education. Warmth of Speech and Cold Type. Hygeia, November, 1933. "Damaged Lives"—A New Motion Picture. Where to Find It. Invitations and Reminders. Dear Editor—Would It Be Worth While?	
Books and Reports . . . . .	1333
A Practical Medical Dictionary. Fetal, Newborn, and Maternal Morbidity and Mortality. Our Movie Made Children. A Short History of Dentistry. I Go Nursing. The Road to Health, Book I and Book II. Report on General Survey of the Problems of Sewage Treatment and Disposal in Willamette River Valley, Oregon. Safety First for Little Folks. Frontiers of Medicine. Public Health Nursing in Industry. To Be or Not to Be—A Study of Suicide.	
Books Received . . . . .	1337
A Selected Public Health Bibliography— <i>Raymond S. Patterson, Ph.D.</i> . .	1338
News from the Field . . . . .	1340
Conferences . . . . .	XX

INDEX TO ADVERTISERS

	Page		Page
A. P. H. A.....	XII	Directory of Health Service.....	XXIII
Book Service . . . . .II, IX, XI, XIV, XVI, XXV		Black & Veatch	
Disease Chart . . . . .	XXI	Committee on Administrative Practice,	
Employment Service . . . . .	XXIV	A.P.H.A.	
Health Bulletin Service.....	XXII	Remington Rand, Inc.	
Membership Application Form.....	XXII	Eimer & Amend, Inc.....	XXI
Milestones of Public Health Chart.....	XVII	Fleischmann's Yeast . . . . .	III
Affiliated Societies . . . . .	XIV	General Laboratories, Inc.....	VII
American Journal of Cancer, The.....	XVI	Gilliland Laboratories, Inc., The.....	XIII
American Journal of Nursing, The.....	XI	Hynson, Westcott & Dunning.....	XIII
California Fruit Growers Exchange.....	IV, V	Kellogg & Company.....	XX
Canadian Public Health Journal.....	XV	National Organization for Public Health	
Cereal Soaps Co., Inc.....	XX	Nursing . . . . .	XV
Derbac . . . . .	XX	Standard Brands, Inc.....	III
Difco Laboratories . . . . .	Back Cover	Trained Nurse, The.....	VII
Directory of Health Service.....	XXIII	Wallace & Tiernan Co., Inc.....	XVIII
American Water Works Association		Water Works Engineering.....	XI
Bendiner & Schlesinger			

# A HALF CENTURY OF PUBLIC HEALTH 1872—1922

---

In commemoration of the 50th Annual Meeting of the American Public Health Association in New York, in 1921, a series of historical articles were written and published in book form under the title "A Half Century of Public Health."

The period covered by the essays is notable for all time by remarkable discoveries in every branch of science, and particularly in medicine, both curative and preventive. The conception and development of the entire public health movement were carefully traced and summarized by the historians, and the result was, and is, a volume of far-reaching importance and significance.

As an outline of public health, "A Half Century of Public Health" has not been surpassed. It is brief, concise and accurate. It presents the history of every important branch of public health in nineteen chapters, each written by a specialist. The regular edition of "A Half Century of Public Health" has been exhausted long since. There remain less than 200 copies of the deluxe edition and on these the price is now lowered from \$10.00 to \$7.50.

This is the time to add "A Half Century of Public Health" to your library or to the library of a friend.

*Order from*  
**American Public Health Association**  
450 Seventh Avenue, New York, N. Y.

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

January, 1933

Number 1

## Effectiveness of Child Health Programs in Ontario by Survey Methods\*

JOHN T. PHAIR, M.B., D.P.H., F.A.P.H.A.

*Director, Division of Maternal and Child Hygiene, Provincial  
Department of Health of Ontario, Toronto, Canada*

THE statistical incongruities associated with the annual reports of certain municipalities organized for work in the field of child hygiene, led the writer, some years ago, to attempt to arouse interest in accurate recording of local effort. This was beset with difficulties. Early in 1930, the department offered to assay the services in certain representative communities. The study upon which the data used in this paper are based was commenced in March, 1930, and completed only a few weeks ago. Our findings are presented with the belief that conditions in Ontario do not differ materially from those in other comparable provinces in Canada, or states in the United States.

While 13 cities were included in the survey, the infant and pre-school effort was not studied in 2—Toronto and Peterborough. The school health service was reviewed in 12. The local objectives were noted, and the records of work performed and results obtained in certain, selected years, were intimately examined.

The difficulties confronting the staff were even greater than I had imagined they might be. In most of the cities, records of work performed were kept on inappropriate forms, or on no forms at all. Calls made, consultations, or other efforts were unrecorded or inadequately recorded. In others, suitable record forms were available, but either their purpose was unappreciated by the staff, or their accuracy was not reviewed often enough to insure care in their keeping.

---

\* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.



In reviewing objectives with those responsible for local public health leadership, we found lack of knowledge, confusion and complacency muddled with earnestness and enthusiasm. An appreciation of the implications involved in a child hygiene program was lacking in many instances. Precept and practice were poles apart. Details of programs had so beclouded the main issue that the original conception was almost entirely lost sight of.

But let us be more specific! We found, in most of the centers, some interest in the possible relationship between indifferent obstetrics, an absence of prenatal and natal supervision, and the deaths occurring in the first month of life. This interest was purely academic in some; in others, it was manifested by the inclusion in the local program of time for prenatal visiting by the nursing staff, and in 2 centers municipally operated prenatal clinics were held. In none of centers concerned had the local authorities established intimate working relations with the medical profession of the community for the purpose of studying the best method of approaching this problem.

Increased hospitalization of maternity cases was apparently being encouraged in all communities, but whether this was part of an organized effort to influence maternal and infant deaths was not apparent. Forty-nine per cent of the births were in hospital. The death rate was apparently the same among these as among those born at home. It is interesting to note that of those women confined at home, 37 per cent were attended before, during, and after labor, by the Victorian Order of Nurses—an estimable organization, Dominion-wide in its scope, with branches in most of the large centers in Ontario—which offers bedside care to those unable to pay the ordinary fees demanded for such service. The standards of the service are high. The infant death rate, particularly in the first month, among those receiving this service was uniformly lower than for the city as a whole in every center in which they operated. Is this statistical fact the direct result of the contact between the nursing organization and the pregnant women? or the contact between the nursing organization and the attending physician? or both?

Despite the fact that prenatal supervision was a local objective, we could find records of only one-quarter of the pregnant women having been seen either by a physician or nurse before the onset of labor—not that I believe that only 25 per cent had prenatal care, but service rendered to the others was unrecorded. We were able to gauge the value of the prenatal service quantitatively only. Of those in which records were available, 29 per cent were seen during the first 6

months of pregnancy; 57 per cent were seen 3 or more times prior to delivery.

Appreciating, however, that an actual interest in the infant before it was born is a comparatively recent responsibility of health departments, we were inclined to be charitable in our criticism, and turned our attention to matters in which official interest was more actively demonstrable. We found that there was greater interest and less confusion in the minds of the municipal health staff when we discussed the subject in terms of infant deaths. The lessening of the infant mortality rate of this age group seemed to be the chief objective of most, and certainly was the yardstick by which all measured the success of their efforts. If it went down, whether justified or not, they took the credit; if it went up, the rise was either unexplained or was due to some cyclic epidemiological phenomenon not amenable to control.

In support of the efficiency of the local service, they told us how many children under 1 year attended the well baby clinics, and how often they came. This seemed to be the standard by which they desired their efforts to be measured. Nobody could tell us how many of the 8,428 infants born alive in the first 11 months of the year under survey, and who lived a month, were regularly under the care of the family physician or pediatrician. We ultimately uncovered the fact that about 17 per cent had been seen by a physician some time during their first year; whether it was to cure existing ills or prevent future ones, nobody knew. This was a definite weakness apparent in all the programs studied.

The local infant hygiene program was uniformly set in motion by what was known as a birth registration call by a member of the municipal nursing staff. The purpose of these introductory visits was vague in the minds of many of those making them. In many instances, they appeared to accomplish nothing more than a distribution of literature appropriate to the health needs of infancy, and a list of the municipally operated clinics. That the visits were made with faithfulness, however, is indicated by the fact that 76 per cent of these new arrivals were called upon. Our survey group was struck at this point with lost opportunity resulting from lack of appreciation by the nurse visitor as to the possibilities of this stage of the program.

In 5 of the cities only were medical men directly associated with the clinics carried on by the health departments. These were operated along orthodox lines, usually by physicians with a special interest in the field of child health. They received a small honorarium for their services in practically all centers. In the 6 cities in which there was

no medical attendant at the clinic, the gathering was described as a child health conference. The community nursing staff met the interested mothers at a given place, at a given time, and gave such advice as might possibly emanate from a nursing service. Irrespective of whether the gathering was a clinic or conference, the social or financial status of those attending had no bearing on their eligibility to be present—the socially prominent or socially obscure were equally welcome.

While clinic attendance was urged in every center, no uniform method of assuring its continuity was in effect; 49 per cent of those called on attended on at least 1 occasion, but only 53 per cent of those who came could be described as regular attendants. Adequate reasons for failure to return were hard to find. In some centers, there was the feeling that once they were made acquainted with the available facilities, the onus for failure to return was on the parents. In some, a home visit was paid following the first lapse in attendance; in others, one gathered that a modified clinic service was extended to those failing to attend regularly, through home visiting by the nursing staff. In 1 city only, had there been an attempt to analyze the reasons for failure to return. In the majority of centers the staffs seemed content to concentrate their efforts on those who were desirous of taking advantage of the service as offered and leave the balance to their own devices. Twenty-three per cent of all the children who lived over 1 month were regular clinic attendants.

Just what the clinic or conference offered those who came might very well be the subject of careful study—64 per cent of them were noted as having seen the clinic physician when the clinics were medically served. This did not mean that they had all been actually medically examined, however.

Group instruction was not attempted in any of the conferences. A child was weighed—if a degree of normal progress was maintained, apparently the mother was complimented; if failure to gain was noted, a casual inquiry was conducted. Few of the findings following this inquiry were ever recorded on the clinic form, however. Evidently the value of regular weighing as a gauge of physical progress was impressed upon the parents, and many on the advice of their private physician took their children to the center merely to have them weighed. Many of these gatherings had a social aspect: tea was served and the natural maternal pride in one's offspring was given an opportunity to manifest itself. The fact remains that many came and good must have resulted, but the extent of this good could not be measured. As was to be expected, the death rate among

the group of regular clinic attendants was lower than that for the municipality as a whole.

A review of the infant deaths was interesting, in that we found that of those stillborn, 49 per cent were delivered in hospital, and 39 per cent of these had had prenatal care; 49 per cent of those dying in the first month were born in hospital, and 47 per cent of these had had medical supervision during the period of pregnancy. Prematurity was described as the cause of death in 63 per cent of those dying during the first 24 hours, with congenital malformation the only other considerable cause of death. In those dying in the first week, prematurity was again responsible for the largest number of deaths, with cerebral hemorrhage second. Among those living over 1 week and dying within 1 month, prematurity is again noted as being responsible for a larger number of deaths than any other single cause. Gastrointestinal diseases constituted the chief cause of death in the group living 1 month but dying within the first year.

Breast feeding was practised in 58 per cent of all and in 36 per cent of those dying within the first year. Breast feeding was supplemented by artificial feeding in 21 per cent of all and in 39 per cent of those dying during the first year. Artificial feeding was practised only in 21 per cent of all and in 25 per cent of those dying during infancy. Pasteurization was the vogue in every municipality.

The economic status of the parents of the children dying in the first year was as follows: good, 28 per cent; fair, 31 per cent; and poor, 41 per cent. The intellectual status was estimated as follows: 29 per cent were fully alive to their responsibilities as regards the health of their children; 35 per cent seemingly were not as child-health-conscious as the first group, but were aware of the existence of the service offered by the local health departments. In 36 per cent, the mental attitude toward health was poor.

#### PRESCHOOL AGE

The local health program as it affected children between 1 and 5 years was, in all but 2 centers, an attempted extension of the clinic and conference service offered to infants; the success of which may be gauged by the fact that 51 per cent of those attending the clinics as infants continued for a period of at least 1 year as toddlers. The number of these still attending at 5 years of age was negligible, however. The number registered at the clinic after they were 1 year of age was larger in some centers than had been imagined. Thirty-five per cent of all attending were examined by the clinic physician in the cities in which physicians were attached to the service.

In but few of the centers was there a concerted effort being made to arouse the interest of parents in having the family physician regularly examine these children. Opportunities for immunization against diphtheria, smallpox, and, in one or two places, whooping cough, were extended by the clinic. In the 2 cities referred to above, the clinic service was supplemented by an organized attempt to have the children of 4 years of age annually examined by either the family physician, on forms supplied for this purpose, or by the medical staff of the local health department, aided by physicians temporarily employed.

#### SCHOOL AGE GROUP

Details as to the type and size of the various municipalities included in the survey have been deliberately left out of this report, but it is necessary to state that in Toronto, only a section of the city was studied—a representative district being chosen by the local Health Department. The study in Hamilton was not completed in time to include it in this presentation.

In 7 of the municipalities, the school health service is carried on under the auspices of the local school authorities; in 5, it is an activity of the health department. In 4 of the former there is no medical man directly associated with the work. It has been thought wise, therefore, to separate the findings in these communities from those of the 8 centers in which physicians are included in the program. They are labelled, Group 1, and Group 2.

It was found in Group 1 (comprising those cities in which the work had medical leadership) that 51 per cent of the children in attendance at school were examined by the school physician during the 2 years under review; 37 per cent of these were examined with 1 parent present. (In 2 of the cities, parents are not invited to attend at the time of the examination.) The attendance of parents in cities in which this practice was in effect reached 47 per cent. Of the children examined, 7,217, or 41.5 per cent had notifiable defects; 9,914 defects were recorded; 3,600 were labelled as in need of supervision. Twenty-nine per cent of those with defects had one or more of these corrected during the 2-year period; 34.5 per cent of which were corrected upon notification only; that is, the statement given the parent at the time of the examination by the examining physician, or the notification sent home with those unaccompanied by parents, was sufficient to influence the parent in securing treatment. Seventy-eight per cent of the children with defects were noted as having abnormal tonsils or adenoid overgrowth which warranted treatment, and 12 per cent had a loss of visual acuity sufficient to necessitate the

advice of an oculist. Fifty-two per cent of the total defects found were abnormal tonsils. Dental defects were not included in the study.

In the 2 cities in which the parents were not encouraged to attend at the time of examination, the percentage of corrections was slightly lower than the others in this group—namely 27 per cent, but 60 per cent of these were effected without any other effort on the part of the staff than the original notification.

Twenty per cent of the corrected defects were corrected within 3 months of their discovery, while in 45.5 per cent a year or more elapsed before correction was finally complete, the reason for delay being inability to pay immediately for treatment in more than 50 per cent of cases. In 51 per cent of those corrected within 3 months, the child had been accompanied by a parent at the time of examination.

Of the large number uncorrected at the end of the 2-year period, less than 30 per cent gave financial reasons as their excuse for not having treatment established, indifference, procrastination, parental objection, being the reasons advanced in more than 60 per cent of the cases in which a reason was noted. Defects of vision were most readily corrected—50 per cent of those found being corrected within the period under study while only 26.5 per cent of the nose and throat conditions were terminated by treatment in the same period.

The family physician or specialist of the family's choice was responsible for the treatment in 69 per cent, while only 31 per cent were treated by charitable agencies. The presence of hospital outpatient services did not materially raise the percentage of those treated in centers so equipped.

Efforts to stimulate correction among the tardy were almost solely confined to home visits by the nursing staff. There was no uniform practice as regards such visiting in effect in the municipalities concerned. In some, the minimum number of visits were paid; in others, few, if any, of those suffering from defects were left unvisited; 34.5 per cent were corrected without call; 23 per cent were called upon once; 36 per cent were visited 2 or more times; no accurate information could be obtained about the balance. Home visits to those uncorrected were as follows—33 per cent had 1 visit, 42 per cent had 2 or more visits, and 25 per cent were unvisited. Corrections were found to be as prevalent in the centers where home visiting was not the vogue as in those where it was intensively carried out. It was apparently a factor, however, in expediting treatment by charitable agencies in such cases as required this type of treatment.

School attendance was noted to be more irregular among those children suffering from defects to the extent of 4.2 days per year. In no center was repetition of a grade considered to be an indication of the need for medical inquiry. The data relevant to improvement in attendance and scholastic progress following the correction of defects was not convincing enough to justify its inclusion.

In the 4 municipalities where the service was entirely in the hands of nurses, a smaller percentage of the children attending school was examined during the 2 years in question, namely 37 per cent. The number of children with notifiable defects was higher than in Group 1, as was the percentage of corrections—55 per cent and 36 per cent respectively. Thirty-four per cent of the defects corrected were done with notification only. While 22 per cent of the children found with defects had below normal vision, only 65 per cent of the defects were associated with the nose or throat. Sixty per cent of the vision defects were corrected and 25 per cent of those with abnormal tonsils.

A higher percentage of the defects found were corrected within 3 months after notification, namely 29. The percentage taking over a year was exactly the same as in Group 1—45.5. The commonest reason for delay in correction was again inability to finance treatment, and among those uncorrected, the number of those giving financial reasons as their excuse for non-correction was much greater than in Group 1—indifference, procrastination, and parental opposition to treatment being less than half what it was in the centers medically served. The family physician was responsible for treatment in a larger percentage of cases in these centers than in those in Group 1.

In Group 2, home visits were paid to 36 per cent of those ultimately corrected; 27 per cent received 2 or more visits, and 34 per cent were corrected merely as the result of notification. Among those uncorrected, 22 per cent had 2 or more home visits paid to them, 33 per cent had 1 visit, 31 per cent had none, and the balance were unrecorded.

The school health staff measurably contributed to the control of communicable disease by urging immunization and interesting the teacher in the prompt exclusion of children showing evidence of such conditions as impetigo, scabies and pediculosis. The number of children suffering from the major communicable diseases actually found by them, either in the school or in the home, except where such disease had already reached epidemic proportions in the community, was negligible.

Health teaching, as such, was not well done by the school health staff. They undoubtedly have, in some instances, stimulated the interest of the teacher in a more adequate presentation of the subject.

## CONCLUSIONS

1. Few of those actually engaged in the field of child hygiene are alive to the need for accurate and adequate recording.
2. In many instances, the purposes of the service have become vague, or have never been appreciated.
3. The relationship between the medical profession and the official health services is not as intimate as might be desired, having in mind our ultimate objective.

Further, there are certain observations which are statistically supported, but which before their final acceptance, warrant careful review by those actually charged with the responsibility for the conduct of a municipal child health service. It is with the hope that the results of this study may prompt such departments to become periodically introspective, that they are presented:

1. The problem of providing all pregnant women with the maximum of prenatal and postnatal care is still a long way from solution.
2. Prematurity is apparently the outstanding factor contributing to the high infant death rate in the first month.
3. The local staffs are bending too much of their effort toward increasing the attendance at the official operating clinic, instead of urging that all children receive regular supervision by the medical men of the community.
4. There is no satisfactory health program in operation which is appropriate to the needs of the preschool age group.
5. We were not able to demonstrate that the school health staff materially aided in the control of communicable disease.
6. The percentage of so-called major defects is predominatingly abnormalities of the tonsils.
7. The percentage of defects corrected is lower than it should be and the present time consuming method of stimulating corrections is limited in its effectiveness.
8. The presence of the parent at the time of examination can increase the interest of both parents and child in health supervision and the establishment of desirable health practices; it aids in arriving at a more accurate conclusion as to the need for treatment; but does not stimulate prompt correction to the extent previously imagined.
9. The percentage of parents who are sufficiently interested in the well-being of their children to require only an intimation that they are physically below par, is fairly constant in all municipalities.
10. Corrections in centers best supplied with free treatment facilities did not exceed those in centers not so equipped, to the extent formerly presumed.
11. Without belittling the value of medical leadership—it was not impossible to operate what appeared to be a comparatively satisfactory school health service by nurses working alone.
12. Here and there, was evidence of sufficient appreciation of objectives, clarity of thought, and originality of execution to encourage us in the belief that an acceptable, sound, and convincing program could be evolved and maintained.



# The Addition of Vitamin D Concentrate to Milk\*

THEODORE F. ZUCKER, PH.D.

*Assistant Professor of Pathology, Columbia University, New York, N. Y.*

THE thought that milk should be the logical medium in which to offer "vitamin D" to infants and children is by no means new. Almost immediately after it had been clearly demonstrated that certain ultra-violet wave-lengths can confer antirachitic properties on food substances, attempts were made in Germany to put this idea into practice. The chief early obstacles in the way of successful activation of milk were the effect on taste and other properties, and the fear of toxic effects. Of late the irradiation of milk has met with a certain amount of success in some German cities. Cost has always been a consideration. The difficulties have apparently been successfully met in the work reported by Dr. George C. Supplee.

During the past years we have been engaged in the further purification and improvement of the antirachitic concentrate from cod liver oil on which we first reported in 1921; and we have recently perfected preparations of higher potency and purity which, when incorporated in milk, will not affect its taste.

For the purposes of study on a practical scale, one dairy has now been licensed to prepare such milk. The concentrate is furnished to the dairy as a "150 D" preparation, i.e., a preparation which by line test is 150 times as strong as the standard cod liver oil according to the Steenbock line test method. This concentrate, when diluted 1 to 12,000 in milk, will give a milk which contains approximately 150 units of "vitamin D" per quart, or the equivalent of 3 teaspoonfuls of cod liver oil. The preparations furnished to the dairy are carefully standardized and assayed. The incorporation can be done either by homogenization, by partial homogenization, or by another method without homogenization. By none of these methods is there any separation of the concentrate from the cream. In the non-homogenized milk the fat globules are of the same range of size as in

---

\* Read as a part of the Symposium on Milks of Special Antirachitic Value before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting at Washington, D. C., October 26, 1932. Other papers from the Symposium will be published later. The Report of the Committee on Milk and Dairy Products, dealing with the administrative aspect of the same subject, will appear in the Year Book.

ordinary milk. The highly potent concentrate as now produced from cod liver oil is diluted down to 150 D for two reasons: to have it in conveniently dilute form for measurement, and to avoid even the remotest possibility of accidental overdosage.

The milk produced in this manner has been frequently assayed on rats for antirachitic potency and has never been found wanting. This should be so, since the concentrate is standardized and the manner of incorporating is of the simplest kind. Studies have also been made of its antirachitic effect on infants. In children receiving about 100 to 150 units daily in milk, effects recorded in the healing of rachitic bones were the same as have been frequently shown with 3 teaspoonfuls daily of cod liver oil. Both X-rays and blood phosphorus showed a return toward normal in about 2 weeks, and cases of complete healing as judged by X-ray were recorded in about 40 days.\*

The "vitamin D" milk made by the addition of a concentrate has certain characteristics which may distinguish it from other "vitamin D" milks.

1. It contains the "natural vitamin D," i.e. the same antirachitic substance we have always dealt with in cod liver oil. Steenbock<sup>1</sup> has recently presented evidence that the product made by artificial irradiation of sterols is not the same active substance as that occurring naturally in cod liver oil.

2. The rat assay data can be directly applied to human needs, avoiding the confusion and uncertainty we encounter in irradiated products. This is important, since all methods of standardization so far proposed involve the assay by means of rats.

3. The preparation of the milk is of the simplest kind, necessitating no extra equipment and not depending on special controlled feeding of cows. The chance of error is minimal, since only a simple measurement of a standardized, previously assayed concentrate is involved.

4. The price of the milk will, to begin with, be distinctly less than the price of ordinary milk plus the price of an equivalent amount of an average good cod liver oil. One dairy has been licensed to produce this milk, and the figures for cost are actual cost to consumer including all marketing and assay costs.

These facts are presented, not so much with a view to showing any relative superiority of one "vitamin D" milk over another, but rather for the consideration of the conditions under which one or the other milk may become a practical project.

If public health measures are to be instituted by means of "vitamin D" milk, a number of questions must receive careful consideration.

1. Can a milk of sufficiently constant potency be produced regularly in a dairy? The simplicity of the process involved in the incorporation of the concentrate in milk gives us relatively high assurance that errors can be avoided.

---

\* These studies were made on 15 rachitic infants by Dr. Donald J. Barnes at the Children's Hospital in Detroit (in press).

Assays have been carried out on a considerable number of samples made under actual production conditions. These have uniformly shown the required number of units.

2. What is the most practical number of units of "vitamin D" per quart? We tentatively suggest 150 units per quart since this corresponds to the generally accepted dose of 3 teaspoonfuls of cod liver oil for any except very young infants, who would automatically receive smaller amounts in proportion to food intake. However, the number of units per quart can be so easily adjusted that any demand for other levels can be very readily met, if necessary, even by prescription.

3. Is there any danger either to the consumer's health or otherwise in putting this "vitamin D" milk on the market? Since we are dealing with the same antirachitic principle as has been used for many years in cod liver oil, there is no reason to believe that 150 units is either too high or too low. The effectiveness of the concentrate in various species (rat, chicken and man) is entirely parallel to that of cod liver oil. The small amount of cotton seed oil used as a solvent, diluted in the milk in the ratio of 1 to 12,000, is of no consequence. The question has been raised whether the introduction of "vitamin D" milk will discourage breast feeding, but there seems to be no very positive opinion one way or another. The possibility of encouraging self-medication is no more serious than that involved in the spread of knowledge concerning the beneficial effects of sunlight.

4. What does the project involve from the standpoint of enforcement agencies? The question has been raised whether the introduction of "vitamin D" milk will not put an undue burden on the officials entrusted with the enforcement of pure food laws or necessitate the establishment of large numbers of laboratories for biological assays. A cursory survey shows that in many states there are laboratories in state institutions (state university, agricultural college or experiment station) which are carrying on work of this type, and that such laboratories are increasing in number. There should be no difficulty in selecting in each state one institution to carry on the biological assays. To such designated laboratory the enforcement officials could forward the samples as taken up and receive a report in 12 to 14 days. The cost of these assays when done regularly and in suitable numbers is not as high as is commonly thought, and could be easily defrayed by the milk organization or the producer of concentrate without any significant increase to the consumer. As far as the pure food laws and the addition of foreign material to milk are concerned we should not rely on precedent such as acidophilus milk or chocolate milk but should allow this "vitamin D" milk to stand on its own merits. If it is not a useful project it should be rejected; if it is useful, the laws can be amended. In the meantime, wherever necessary, temporary permits such as are often granted will allow a thorough trial to be made as to usefulness and practicability.

#### REFERENCE

1. Steenbock. *J. Biol. Chem.*, July, 1932.

NOTE: A plan of state supervision including biological assays at the State Agricultural College has in the meantime been put into effect in Michigan.

# Nutritive Value of Cranberries\*

CARL R. FELLERS, PH.D., F.A.P.H.A. (*Life Member*)

*Massachusetts State College, Amherst, Mass.*

AMONG the fruits, the cranberry is unique in several ways. It is among the last of the fruits to mature before winter, and because of its good keeping qualities is the only fresh berry available during the autumn and early winter. Normally the cranberry is consumed only after cooking. Cooked cranberries form a firm sauce or jelly with 40–45 per cent of sugar, whereas other fruits require from 65–70 per cent. The flavor and chemical composition also serve to differentiate the cranberry from other fruits.

The cultivated cranberry (*Vaccinium macrocarpum*) is grown principally in four areas in the United States: Massachusetts, New Jersey, Wisconsin, and Oregon-Washington. Of the annual crop of about 500,000 barrels or 50,000,000 pounds, Massachusetts produces about 65 per cent. The annual per capita consumption is approximately 0.54 lb. The active marketing season extends from September 10 to January 1, though cranberries are often available throughout the winter months. Approximately 65 per cent of the crop is sold through the American Cranberry Exchange—an outstanding example of a successful coöperative.

The cranberry grows in low-lying moist bogs or marshes and requires special soils and cultural treatment for successful growth. In Massachusetts there are about 14,000 acres of cranberries, the yield per acre averaging close to 25 bbls. The retail selling price is variable and depends upon the total production, but a fair average is 12 cents a quart (approximately 1 lb.). Though there are probably 50 varieties of cultivated cranberries, only a few are commercially important, among these being Howes and Early Black.

## PROXIMATE ANALYSIS

The cranberry contains about 11.5 per cent dry matter of the composition shown in Table I.

*Food Constituents of Cranberries*—The sugars are relatively low, the acids high. According to Nelson<sup>1</sup> about 88 per cent of the fixed

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

acids are citric, the rest malic. Our data show a benzoic acid content of 0.035 to 0.095 per cent in 10 varieties—amounts that exert considerable preserving action on both the fresh fruit and manufactured products. Experience has shown that after filling the cans or jars with hot cranberry sauce, no further heat treatment is necessary.

TABLE I  
COMPOSITION OF CRANBERRIES

	<i>Per cent</i>
Reducing sugars	4.2
Acids (citric, malic and benzoic)	2.4
Pectin	0.65
Fat and wax	0.4
Protein	0.4
Ash	0.25
Fiber, tannin and undetermined	3.2
Total dry matter	11.5

Quinic acid, or a substance yielding quinic acid, is present to the extent of 0.6–0.9 per cent. This value was obtained indirectly by determining the total hippuric acid in the urine of young men on diets containing known amounts of cranberries. The benzoic acid in the berries was insufficient to account for the amount of hippuric obtained, hence the difference was assumed to be due to quinic acid. Recently Morse<sup>2</sup> has checked these results by more direct analytical methods. Great controversy has raged over the alleged harmful effects of small amounts of benzoates upon human health. In view of the simple method of elimination of benzoic acid from the body—conjugation with glycine to form hippuric acid, which is voided in the urine—the preponderance of scientific opinion, and our findings on young men fed up to 300 gm. of cranberries daily, support the view of the relative harmlessness of cranberries so far as their benzoic acid content goes. However, the recently discovered quinic acid is present in much larger quantities and, as Quick<sup>3</sup> has proved, is transformed first to benzoic and finally to hippuric in a manner analogous to benzoic acid itself. The elimination of quinic acid from the body though slower, is usually complete in 12 hours. Blatherwick<sup>4</sup> found that large doses of both prunes and cranberries increased the organic acids of the urine. Prunes produced twice as much hippuric acid as cranberries. The dose of cranberries fed was 300 gm., equivalent to almost 2 lb. of cranberry sauce.

Our data bearing on the effect of cranberries on urinary acidity and the blood alkali reserve are presented in Table II.

The hippuric acid in the urine is practically proportionate to the

TABLE II

EFFECT OF CRANBERRIES ON HIPPURIC ACID IN THE URINE AND THE BLOOD PLASMA ALKALI RESERVE

<i>Wt. of Cranberries Fed Grams</i>	<i>Equiv. Wt. of Cranberry Sauce Oz. Avoir.</i>	<i>No. of Subjects</i>	<i>Decrease pH Urine</i>	<i>Hippuric Acid Mgs. in 100 c.c. of Urine Increase Over Normal</i>	<i>Alkali Reserve c.c. of CO<sub>2</sub> per 100 c.c. plasma Decrease from Normal</i>
22.0	2.0	4	+ .06	0.1	+0.9
32.7	3.0	2	.00	0.53	+0.8
54.0	5.0	2	.08	0.32	+3.5
100.0	9.2	2	.16	0.76	14.7
150.0	14.0	2	.21	1.68	23.0
200.0	18.6	2	.23	2.15	33.1
250.0	23.2	4	.35	2.48	40.8
300.0	27.5	2	.42	3.60	46.5

weight of cranberries eaten though small doses affect the acidity very little. Similarly the pH of the urine was affected appreciably only after the administration of rather large quantities of cranberries.

The alkali reserve showed no decrease until more than 54 gm. of cranberries, equivalent to 5 oz. of cranberry sauce, had been eaten. Thus, usual, or even liberal servings of this sauce, do not appreciably affect the body's alkali reserve. The buffer action of the blood probably accounts for this protective action. Very large doses do produce significant transitory decreases in the blood alkali reserve.

Apparently the citric and malic acids present in cranberries are fully oxidized.

*Other Constituents*—Pectin is present in considerable quantity and is the constituent responsible for the high jellying power of cranberry sauce. The fruit must be cooked with boiling water to extract the pectin. Unlike other fruits the pulp or juice forms a firm jelly at a sugar content of 40–45 per cent.

TABLE III

NUTRITIVE PROPERTIES OF CRANBERRY SAUCE

<i>Constituent</i>	<i>Mg. per 4-oz. serving</i>	<i>Constituent</i>	<i>Mg. per 4-oz. serving</i>
Reducing sugars	48,590.0	Copper oxide (CuO)	0.4
Fruit acids (as citric)	916.0	Phosphorus pentoxide (P <sub>2</sub> O <sub>5</sub> )	9.8
Protein	172.0	Sulfur trioxide (SO <sub>3</sub> )	5.3
Fat and wax	160.0	Chlorine (Cl)	1.7
Total ash constituents	107.0	Iodine (I)	0.002
Fiber (whole fruit sauce)	3,600.0	Vitamin A	+
Potassium oxide (K <sub>2</sub> O)	33.0	Vitamin B	—
Sodium oxide (Na <sub>2</sub> O)	3.4	Vitamin C	++
Calcium oxide (CaO)	10.7	Vitamin D	—
Magnesium oxide (MgO)	4.7		
Iron oxide (Fe <sub>2</sub> O <sub>3</sub> )	1.8	Calories per 4 oz. serving	200.0
Manganese oxide (Mn <sub>2</sub> O <sub>3</sub> )	0.3	Alkalinity of the ash	2.2

The wax is present largely on the skins and acts to protect the fruit from water, insects and fungi. The protein content is low, about 0.4. The fiber, consisting largely of skins and seeds, is not objectionable in whole fruit sauce, and aids in elimination. The cranberry itself is mildly laxative.

The ash content is relatively low, but its reaction is definitely alkaline, in several varieties averaging 2.2. In spite of this some writers have stated that "prunes, plums and cranberries" are exceptions to the fruits that leave alkaline residues after digestion.

Table III shows the principal ash and other constituents as calculated from our analyses. Since the berries are seldom eaten raw, the figures are given in terms of a normal serving of cranberry sauce—1 lb. of cranberries yields approximately 2.6 lb. of sauce.

The ash constituents are largely potassium, calcium and phosphorus. Morse,<sup>5</sup> and McClendon<sup>6</sup> have determined the iodine content, which ranges from 26 to 138 parts per billion. This is relatively high for fruits and vegetables, and cranberries thus approach some marine foods in iodine content. The manganese content is likewise significantly high.

#### VITAMINS OF CRANBERRIES

The writer in collaboration with Isham has just completed a vitamin survey of cranberries. Only a summary of the results can be given here.

Using the Sherman, LaMer and Campbell<sup>7</sup> technic, we found the vitamin C content of fresh cranberries in 1930 and 1931 to be relatively high—from 3 to 4 gm. daily sufficing to maintain normal growth and afford full protection from scurvy in 300 gm. guinea pigs. There

TABLE IV  
VITAMIN C CONTENT OF CRANBERRIES

<i>Form of Cranberry</i>	<i>No. of Guinea Pigs</i>	<i>Quantity Fed Grams</i>	<i>Gain in Wt. Av. 90 Days</i>	<i>Survival Period Av. Days</i>	<i>Scurvy Score Av.</i>
Early Black	5	3	182	90	1-2
" "	5	5	134	90	0
" "	5	10	153	90	0
Howes	3	1	—58	42	12
"	3	2	4	90	7
"		4	123	90	0
Frozen Howes (9 mos.)	4	4	165	90	0-1
" " "	4	5	246	90	0
Howes (40° for 3 mos.)	5	4	218	90	0
" (40° for 7 mos.)	6	5	130	90	6
" (40° for 9 mos.)	3	10	176	90	2
Howes (juice boiled 2 min.)	6	4	190	90	0
" ( " bottled pasteurized)	5	8	—169	49	10

TABLE V  
VITAMIN C CONTENT OF CRANBERRY PRODUCTS

<i>Form of Cranberry</i>	<i>No. of Guinea Pigs</i>	<i>Quantity Fed Daily Grams</i>	<i>Fresh Cranberry Equiv. Wt. Grams</i>	<i>Gain in Wt. Av. Grams</i>	<i>Survival Period Av. Days</i>	<i>Scurvy Scored Av.</i>
Whole fruit sauce	9	10	4	83	90	4
" " "	3	14	5.4	279	90	0
Strained sauce	6	20	8	—30	54	11
" " (canned)	9	20	8	—59	45	15
Whole-fruit sauce (canned)	6	12	4.6	—60	65	5
Evaporated whole	3	2	16	—120	37	16
Film or powder						
(Quick-dried)	3	2	16	164	90	0
" "	3	1	8	3	90	4

was no varietal difference. The fresh fruit when stored for 3 months at 40° F. showed very little loss of vitamin C. Freezing and subsequent storage at 0° F. for 9 months did not affect the vitamin C content. However, alternate freezing and thawing had a very destructive effect. Evaporated whole cranberries contained no measurable amount of vitamin C, but a quick-dried powder or film retained over 50 per cent of the original C content. Cranberry juice is becoming a popular beverage. The fresh juice is fully as potent as the fruit, but after extraction, bottling, and processing, little of the vitamin C is retained by the methods now in use.

Whole-fruit cranberry sauce as usually prepared contains approximately 80 per cent of the original vitamin C content, but strained sauce retains less than 10 per cent.

Vitamins B and D were absent or present in such small quantities as to be insignificant. Vitamin G was present in traces only. Vitamin A was present in small but measurable amount—1.2 units per gm. This was sufficient to cure xerophthalmia in rats and produce normal growth.

#### SUMMARY

Aside from its esthetic values of eye and taste appeal, the cranberry is valuable in the diet chiefly for its high vitamin C, iodine, and energy values. The ash is slightly basic and contains significant amounts of potassium, phosphorus, manganese, and iron.

The benzoic acid content of fresh cranberries varies from 0.035 to 0.095 per cent and quinic acid from 0.6 to 0.9 per cent.

Moderate, or even generous servings of cranberry sauce do not lower the blood alkali reserve but very large quantities decrease it significantly.

The conjugation of benzoic and quinic acids in the body produce urinary acidities in proportion to the amounts of cranberry ingested, though servings of 5 oz. or less of cranberry sauce produce little change in either pH or hippuric acid values.



Fresh and frozen cranberries and whole-fruit jellied sauce are excellent sources of vitamin C and contain significant amounts of vitamin A as well. Vitamins B, D, and G are not present in significant amounts.

The cranberry possesses considerable merit as a food and when eaten in normal quantities its wider use in the diet can be recommended.

#### REFERENCES

1. Nelson, E. K. The non-volatile acids of the pear, — cranberry —. *J. Am. Chem. Soc.*, 49:1300-1302, 1927.
2. Morse, F. W. Unpublished data 1932; See also: A chemical study of cranberries, *Mass. Agri. Exper. Sta. Bull.*, 265:89-102, 1930.
3. Quick, A. J. The conjugation of benzoic acid in man. *J. Biol. Chem.*, 92:65-85, 1931.
4. Blatherwick, N. R., and Long, M. L. Studies on urinary acidity. II. The increased acidity produced by eating prunes and cranberries. *J. Biol. Chem.*, 57:815, 1923.
5. Morse, F. W. Iodine content of Cape Cod cranberries. *J. Biol. Chem.*, 79:409-411, 1928.
6. McClendon, J. F. Iodine in cranberries. *American Cranberry Exchange Report*, 1930.
7. Sherman, H. C., LaMer, V. K., and Campbell, H. L. The quantitative determination of the antiscorbutic vitamin. *J. Am. Chem. Soc.*, 44:165-172, 1922.

---

## Industrial Medicine

A NEW illustrated journal of professional, scientific and public health interest, entitled "Industrial Medicine," made its appearance with Volume I, No. 1, October, 1932. It is devoted to the industrial interrelations of medicine, law, insurance, and economics, and aims at the cumulative study of these.

The journal contains articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussions and on this basis contributions are invited.

Issue No. 2, November, 1932, contains 75 pages. We note that 12 pages were devoted in this issue to a synopsis of pertinent papers presented at the Washington Meeting of the American Public Health Association.

Publication office—844 Rush St., Chicago, Ann. sub. \$5.00. E. R. H.

# Laboratory Diagnosis of Endemic Typhus and Rocky Mountain Spotted Fever\*

L. F. BADGER, M.D.

*P. A. Surgeon, U. S. Public Health Service, Washington, D. C.*

THERE is widely scattered throughout the world a rather large group of diseases commonly referred to as the typhus-like group of fevers. The members of this group have many characteristics in common and are characterized in man by a sudden onset, chills, fever, severe headache, various degrees of prostration, mental symptoms, arthralgias and myalgias, and an exanthem. The viruses of several have been shown to produce agglutinins to *B. proteus* X<sub>19</sub>. An insect vector has been incriminated epidemiologically in all and proved in some. Two members of this group, endemic typhus and Rocky Mountain spotted fever, occur endemically in the United States and the discussion in this paper will be confined to these.

THE experimental animals routinely used are the guinea pig, rabbit, and monkey, and the materials routinely employed in making inoculations are whole blood in spotted fever and whole blood and testicular washings in endemic typhus. Other materials may be used but those mentioned have been proved the most satisfactory.

The identification of a virus of endemic typhus or of spotted fever is based on the fulfilment of the following criteria: The clinical manifestations and pathological anatomy produced in animals by the unknown virus must be similar to those produced by the known virus; the production in the sera of rabbits and monkeys of agglutinins to *B. proteus* X<sub>19</sub>; the production of a definite and complete cross-immunity between the unknown virus and the known virus. Cultures of the cardiac blood of animals from which inoculations are made should be negative.

## THE DIAGNOSIS OF A VIRUS OF ENDEMIC TYPHUS

*Clinical Manifestations and Pathological Anatomy*—In the female guinea pig the only clinical manifestation is fever, while in the male

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

an involvement of the external genitalia in addition to fever is the rule. The onset is abrupt after an incubation period varying with the material employed in making the inoculations. Generally the period of incubation is from 2 to 4 days following intraperitoneal inoculations with testicular washings, and from 6 to 10 days with blood or emulsion of brain tissue. The febrile response is irregular with a maximum temperature varying from  $40.0^{\circ}$  to  $40.5^{\circ}$  C. and a duration averaging from 6 to 7 days.

The most characteristic clinical sign of endemic typhus in the guinea pig is the involvement of the male external genitalia. This usually appears with the onset of fever, although it may appear a day or two before or after. The involvement is characterized by a diffuse erythema and edema of the scrotum, which may become markedly swollen and tense, and by an enlargement of the testicles which when well developed prevents them from being forced into the abdominal cavity. This condition gradually subsides and the tissues return to normal.

Macroscopically the appearance of the abdominal organs varies with the stage of the disease. For the first few days after onset the spleen is normal in appearance, while later it may be slightly enlarged and darker than normal with prominent Malpighian bodies. In the first day or two the testicles are swollen and the surrounding tissues are edematous with the vessels engorged. There is seen early a thin layer of exudate over the testicles. Hemorrhages may appear in the tissues, particularly at the poles. Later the tunica is thickened and adhesions develop.

Histological examination of sections of the brains of guinea pigs which have reacted to the virus reveals the vascular and nodal lesions seen in epidemic (louse-borne) typhus. These lesions, although less frequent than seen in some strains of epidemic typhus, have been found in approximately 25 to 60 per cent of the male\* guinea pigs examined. The percentages have varied with the different strains of virus studied.

The clinical manifestations in the rabbit are indefinite. In a series of 69 male rabbits, 33 at no time had any evidence of fever, 15 had fever for 1 day, 6 for 2 days, and 1 had a fever lasting 3 days. None of the 69 showed any involvement of the external genitalia.

Monkeys react clinically with fever only. Eleven of a series of 13 monkeys responded to inoculation with a definite febrile reaction following periods of incubation of 1 to 4 days, with maximum temperatures of  $40.0^{\circ}$  C. to  $41.3^{\circ}$  C., the duration of the febrile periods

\* Only male guinea pigs employed.

varying from 3 to 11 days. None of the monkeys showed evidence of an exanthem.

The mortality is nil in laboratory animals reacting to inoculations with an endemic typhus virus uncomplicated by secondary invaders.

*The Weil-Felix Reaction*—As a rule, the virus of endemic typhus produces agglutinins to *B. proteus* X<sub>19</sub> in the sera of rabbits and monkeys. In a series of 69 rabbits the sera of 52, or 75.3 per cent, gave complete agglutination (4+) in the titer of 1:80 or higher, and 32, or 46.3 per cent, in the titer of 1:160 or higher. The highest titer in which complete agglutination occurred was 1:640. The readings were made once weekly after inoculation and the maximum readings obtained with 7 on the 7th day; 46, or 66.6 per cent, on the 14th day; 14 on the 21st day; and 2 on the 28th day.

Of the 11 monkeys which reacted clinically, the sera of 8, or 72.7 per cent, gave complete agglutination in the titer of 1:80 or higher, and 6, or 54.5 per cent, in the titer of 1:160 or higher. The highest titer in which complete agglutination occurred was 1:640. The maximum readings were obtained from the 10th to the 20th day after the onset of symptoms with but 2 after the 14th day. All maximum readings were obtained after the temperature had returned to normal.

*Cross Immunity*—The guinea pig is the most satisfactory animal with which to carry out cross-immunity tests. Before one can state definitely whether or not an unknown strain of virus is one of endemic typhus, animals immune to the unknown must be tested with a virus of endemic typhus, as well as animals immune to the endemic typhus virus tested with the unknown.

*Rickettsia*—Rickettsiae are found in the tissues of the guinea pigs reacting to the virus of endemic typhus and in stained smears made with scrapings of the tunica.

#### THE DIAGNOSIS OF A VIRUS OF ROCKY MOUNTAIN SPOTTED FEVER

The virulence of Rocky Mountain spotted fever in the north-western states varies in different localities. In the Bitter Root Valley of Montana the mortality rate in the 12-year period, 1917–1928, was 76.8 per cent. In other sections of Montana the rate is around 30 per cent, and in Idaho around 5 per cent. In the states along the Atlantic Coast it has been from 20 to 25 per cent, resembling that in sections of Montana outside of the Bitter Root Valley. The difference in the virulence of the disease in the East and that in the Bitter Root Valley, noted in man, is also evident in laboratory animals. There is noted also a difference in the clinical manifestations in the guinea pig resulting from inoculations with the western virulent virus and the

eastern viruses studied, and which originated both from human cases and ticks infected in nature.

*Clinical Manifestations and Pathological Anatomy*—The febrile reaction in the guinea pig resulting from inoculations with the virus of the eastern type and of the western virulent type are essentially the same; however, there is a tendency for the incubation period to be shorter and the maximum temperature to be higher with the western virulent virus. Generally the period of incubation is from 1 to 4 days and the duration of the febrile period from 7 to 10 days with the maximum temperature from  $40.5^{\circ}$  to  $41.5^{\circ}$  C.

In the male guinea pig reacting to the western virulent virus involvement of the external genitalia is the rule, while such involvement is rare following inoculations with the eastern virus. Two strains of the eastern virus originating from human cases, and 1 originating from ticks infected in nature, have been studied in the male guinea pig. Involvement of the external genitalia has occurred only occasionally and attempts to transmit the involvement to subsequent generations have failed. This genital involvement is characterized clinically by erythema and swelling of the tissues of the scrotum. In a light colored animal the onset of the scrotal involvement has been noted as small reddish macules which become confluent and later hemorrhagic. Ulceration of the scrotum often occurs. If the guinea pig recovers the swelling subsides, the ulcers heal, and the tissues return to normal.



PHOTOGRAPH I—The appearance of the scrotum of a normal guinea pig



PHOTOGRAPH II—Scrotum of a guinea pig reacting to an intraperitoneal inoculation of a strain of *S. enteritidis*

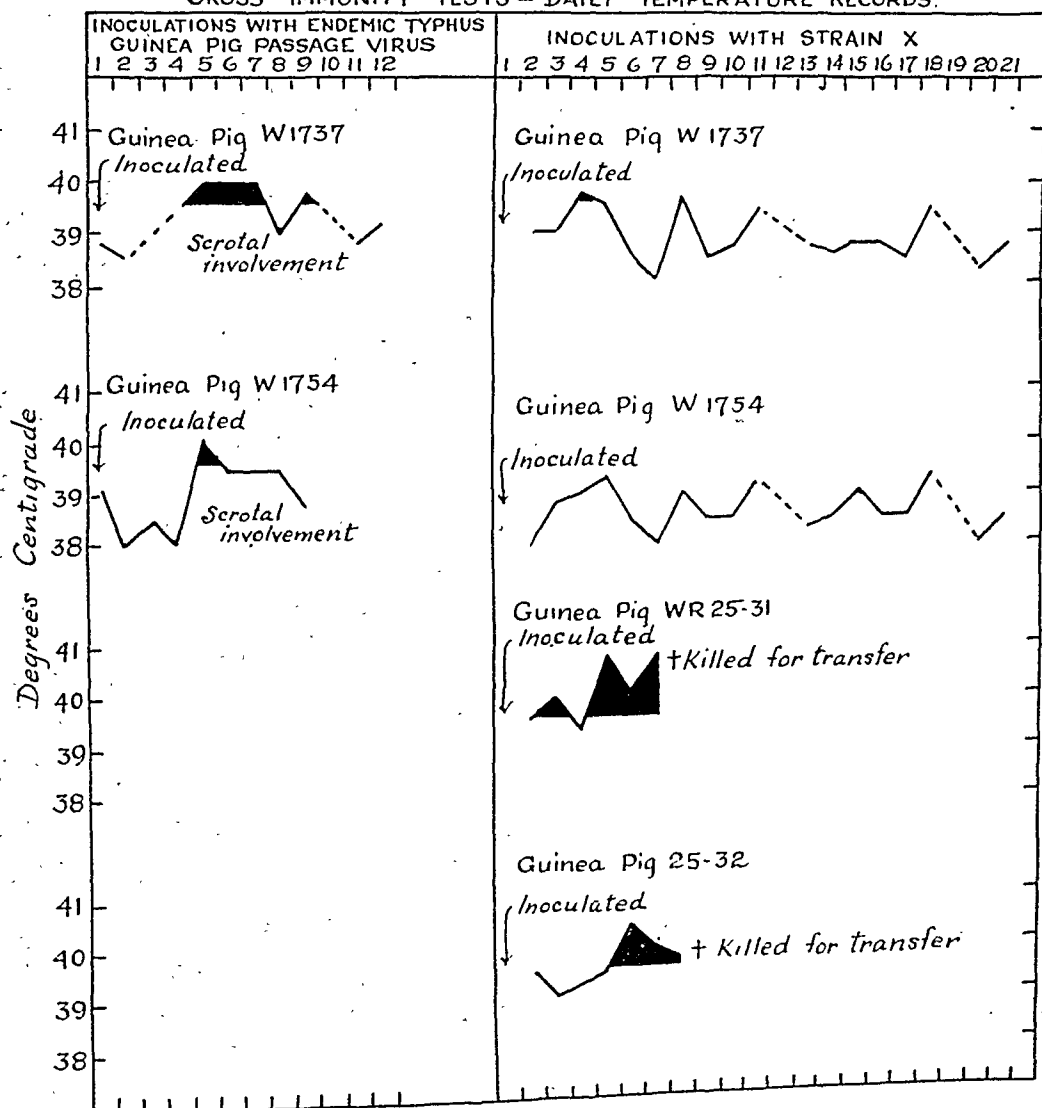
The mortality rate in the guinea pig infected with the western virulent type is approximately 90 per cent, and that of the eastern type approximately 60 per cent.

On post-mortem examination during the early days of the disease the spleen is, as a rule, markedly enlarged, 3 to 5 times its normal size, smooth and darker than normal. With the viruses of the eastern type studied the testicles are normal, while with the western virulent virus they are enlarged and the surrounding tissues edematous. Later in the disease exudate may appear on the testicles and adhesions may form.

Histological examination of sections of brains of guinea pigs which have reacted to either the western virulent or the eastern virus reveals the presence of nodal and vascular lesions like those seen in typhus.

CHART I

CROSS IMMUNITY TESTS — DAILY TEMPERATURE RECORDS.



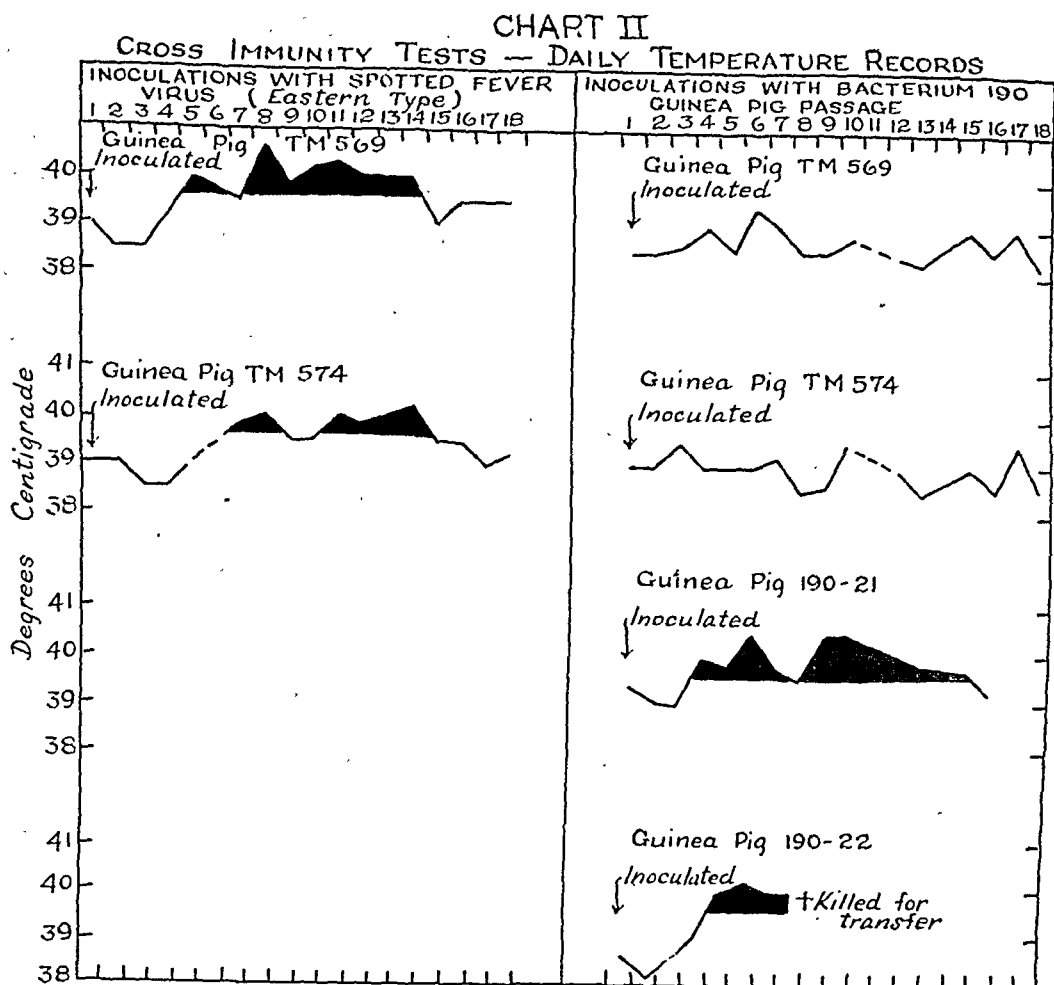
In the clinical manifestations in the rabbit there has been no difference noted between the western virulent and the eastern viruses. After an incubation period of 2 to 7 days, the rabbit becomes febrile, the febrile period varying from 4 to 10 days with a maximum temperature of  $40.0^{\circ}$  to  $41.0^{\circ}$  C. In the male there may occur an involvement of the external genitalia characterized by erythema and edema of the tissues of the scrotum and enlargement of the testicles. Ulceration of the scrotum may occur.

The apparent difference in virulence between the western virulent and the eastern virus is also noted in the monkey. Thirteen of 16 monkeys inoculated with the eastern virus reacted after periods of incubation of 3 to 8 days, while each of 15 monkeys inoculated with the western virulent virus reacted after periods of incubation of 1 to 3 days. The maximum temperature varied from  $40.0^{\circ}$  to  $41.4^{\circ}$  C. with the former, and  $40.8^{\circ}$  to  $41.6^{\circ}$  C. with the latter. All but 1 of the monkeys inoculated with the western virulent virus died, while but 2 of those inoculated with the eastern virus died. Eleven of the 15 inoculated with the western virus developed a definite exanthem in comparison with 8 of the 16 inoculated with eastern virus. In each instance the lesions first appeared over the brows and face in the form of rose colored macules. These lesions may become papular and purpuric or they may remain as macules. The lesions may be confined to the face or become general.

*The Weil-Felix Reaction*—The sera of 6, or 75.0 per cent, of 8 rabbits reacting to the western virulent virus gave complete agglutination with *B. proteus* X<sub>19</sub> in the titer of 1:80 or higher, while but 4, or 26.6 per cent, of 15 rabbits reacting to the eastern viruses gave complete agglutination in the same titer. The maximum readings were obtained in each instance in 7 to 14 days after the onset of symptoms. The maximum readings were also obtained after the temperature had returned to normal.

The maximum agglutination with the sera of the monkeys inoculated with the western virulent virus could not be determined as 14 of the 15 inoculated died in from 3 to 8 days after the onset. The production of agglutinins for *B. proteus* X<sub>19</sub> in the sera of monkeys inoculated with the eastern viruses is not constant. The sera of but 5 of 13 monkeys reacting clinically gave complete agglutination in the titer of 1:80 or higher.

The conclusion may be drawn that the production of agglutinins for *B. proteus* X<sub>19</sub> in the sera of rabbits and monkeys reacting to the viruses of Rocky Mountain spotted fever is not constant but when positive gives strong confirmatory evidence.



**Cross Immunity**—The procedures necessary to determine the immunological relation between an unknown strain of virus and a known strain of spotted fever virus are the same as those discussed in the diagnosis of a strain of endemic typhus virus.

Infections frequently occur spontaneously in guinea pigs and epizootics occurring among stock animals are not rare.

In undertaking to identify an unknown strain of virus suspected of being either typhus or spotted fever it must be borne in mind that known organisms may produce symptoms in laboratory animals, especially in the guinea pig, which cannot be distinguished clinically from those produced by these viruses. It has been found that clinical reactions produced by such organisms are particularly confusing when dealing with a virus, such as that of eastern spotted fever, which produces fever as the only clinical manifestation. Findings which could not be distinguished, either clinically or by the appearance of the abdominal organs, from those caused by the eastern type of spotted fever virus have been produced in guinea pigs by inoculation with a strain of *S. enteritidis*. To add to the confusion, this same organism



has produced occasionally in the guinea pig involvement of the external genitalia, which could not be distinguished clinically from that produced by a virus of endemic typhus. An illustration of this involvement is shown in photograph II.

On account of the confusing clinical reactions in guinea pigs the immunological relation between this strain of *S. enteritidis* and viruses of spotted fever and typhus was studied. In testing the immunity of recovered typhus and spotted fever guinea pigs to the *S. enteritidis* whole cardiac blood of guinea pigs infected with this organism was used. In each instance the *S. enteritidis* was recovered from the blood used in making the inoculations.

Twenty-seven guinea pigs immune either to the western virulent virus or the eastern spotted fever virus, with 49 fresh guinea pigs as controls, were inoculated with this strain of *S. enteritidis*. Seventy and three-tenths per cent of the immune animals failed to react (apparently immune), while but 8.1 per cent of the fresh controls failed to react.

Thirty-two guinea pigs, immune either to the endemic or epidemic typhus viruses, with 45 fresh guinea pigs as controls, were inoculated with this strain of *S. enteritidis*. Thirty-seven and five-tenths per cent of the immune animals failed to react (apparently immune), while but 6.3 per cent of the fresh controls failed to react.

When the immunity of guinea pigs immune to *S. enteritidis* was tested to the viruses of spotted fever and typhus different results were obtained.

Nineteen guinea pigs immune to *S. enteritidis*, with 32 fresh guinea pigs as controls, were inoculated with viruses of spotted fever. Ten and five-tenths per cent of the immune animals failed to react, while none of the fresh controls failed to react.

Seven guinea pigs immune to *S. enteritidis*, with 14 fresh guinea pigs as controls, were inoculated with typhus viruses. None of the animals failed to react.

Illustrations of this non-specific immunity are shown in Charts I and II.

*Chart I*—The male guinea pigs W 1737 and W 1754 were first inoculated with the virus of endemic typhus to which inoculations they reacted with fever and the characteristic scrotal involvement. They were later tested for immunity to the *S. enteritidis* (strain X). This immunity test was controlled by the inoculation of 2 fresh guinea pigs, WR 25-31 and WR 25-32. The 2 immune endemic typhus animals failed to react (apparently immune), while the control animals reacted.

*Chart II*—The guinea pigs TM 569 and TM 574 were first inoculated with the virus of spotted fever (eastern type) to which inoculations they responded with the characteristic febrile reaction. They were later tested for immunity to the *S. enteritidis* (Bacterium 190). This immunity test was controlled by the inoculation of 2 fresh guinea pigs, 190-21 and 190-22. The two immune spotted fever guinea pigs failed to react (apparently immune), while the control animals reacted.

In the charts the shaded portions represent fever, temperature over 39.6° C.

### SUMMARY

There are certain and definite criteria for the identification of an unknown strain of virus as being one of endemic typhus or spotted fever.

With the exception of the involvement of the external genitalia of the male guinea pig the clinical symptoms produced in laboratory animals by the virus of endemic typhus exhibit nothing characteristic of the disease. In the male guinea pig the western virulent virus of spotted fever produces a characteristic involvement of the external genitalia, while the viruses of the eastern spotted fever studied produce no symptoms in the guinea pig which are not produced by some known bacteria. Both the western virulent virus and the eastern virus of spotted fever may produce in the rabbit the characteristic involvement of the external genitalia and in the monkey the characteristic exanthem.

The viruses of spotted fever, as well as the virus of endemic typhus, produce in the brain of the guinea pig the nodal and vascular lesions seen in European louse-borne typhus.

The Weil-Felix reaction has been found positive with approximately 75 per cent of the sera of rabbits and monkeys inoculated with either the endemic typhus virus or the western virulent spotted fever virus. The Weil-Felix reaction has been found positive with but approximately 25 per cent of the sera of monkeys inoculated with the eastern spotted fever virus.

Immunity tests must be clean-cut and made in both directions.

Cultures of the cardiac blood of animals from which transfers are made must be consistently negative, as confusing clinical symptoms and immunity tests have been caused by known bacteria.

# Statistics and the Health Officer

GEORGE B. L. ARNER, PH.D.

*U. S. Bureau of the Census, Washington, D. C.*

IT is not my purpose to review the rise and progress of preventive medicine. It is enough to say that with the concentration of population in the new industrial cities there came the beginning of sanitation. Then in the last half of the 19th century came the brilliant discoveries of Pasteur, Koch, and a host of other scientists, which now form the basis of the efficient work of the modern health officer.

The record of these triumphs of sanitation and preventive medicine is the subject matter of vital statistics. Vital statistics are inseparable from preventive medicine just as accounting is inseparable from modern business. Without vital statistics the health officer, the modern public health administrator, would be working in the dark. He would have no means of measuring the degree of his success or failure. In a small village where the health officer knows every person in town and where he personally attends to the suppression of nuisances and the enforcement of quarantine, he may not feel the need of vital statistics. His statistics may be kept in his head, and he is not aware that they are statistics. The city health officer, however, is the executive head of a public health organization, and as such he must depend upon statistics as the business executive must judge the state of his business by his accounts and his statistical charts.

The health officer does not need to be a vital statistician, any more than a business man needs to be an accountant, but he should be able to understand vital statistics and to use them effectively in his daily work. He should know the uses and the limitations of every device used in vital statistics, although he may depend upon his statistician to compute even the crude death rate and the infant mortality rate.

The health officer is interested in vital statistics from two standpoints: first, in his capacity as local registrar, as the source of the original data; and second, in his capacity as a public health administrator in which he is one of the chief consumers of the product.

The value of vital statistics depends upon the accuracy and completeness of the original observations, for which the local registrar

---

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

is responsible. For the finished statistical product, the statistician is responsible. He must reduce this mass of disconnected observations into the usable form of tables, rates and trends, which are sensitive indices of public health and social conditions. If properly prepared and properly understood and used, these results are an accurate guide to the work of the health officer. Improperly prepared or misused vital statistics may be very misleading.

Statisticians, and those who make use of statistics, are no better and no worse than professional men in other fields. It is one of the reproaches leveled against the medical profession that experts may be obtained to testify on either side of a personal injury case. It is also possible to twist statistics in such a way as to deceive the uninitiated.

At the recent convention of the American Bar Association in Washington, Dean Roscoe Pound told the story of the experience of the Wickersham Commission in the field of statistical analysis. It seems that the Commission had accumulated a vast quantity of undigested material bearing on the subject of their investigation and found that before this material could be used it would have to be boiled down and analyzed by approved statistical methods. The Commission searched far and wide for the highest powered statistician available, and when they had found the man who met the requirements, they presented him with the mass of material and told him to go ahead. The eminent statistician, however, shifted his cigar to the other side of his mouth and asked: "Now, gentlemen, what is it you would like to prove?"

Statistics, like the Holy Scriptures, are usually accepted on faith, and they lend themselves readily to the spreading of false doctrine. The devil can quote Scripture, and the booster, the propagandist, the high pressure salesman, and the unscrupulous advertiser can prove anything by statistics.

Vital statistics, as well as economic statistics, lend themselves readily to the use of the professional booster and to the health officer whose chief interest is his own self-glorification. The public is now thoroughly sold on the advantages of sanitation, and newspaper readers generally have a dim idea that the death rate is a measure of the health of the community. They do not, however, appreciate the refinements of vital statistics. The health officer should understand and correctly interpret the findings of the statistician. For example, the crude death rate is frequently misused by those who do not understand its shortcomings. The crude death rate is easy to compute and readily understood, and is very useful within proper limits,

but beyond those limits it may be grossly misleading. For comparisons between cities or between any two areas of different social composition, it is often improperly used. In a rapidly growing city, the professional booster may call attention to the low death rate of his community as compared with that of some older, slowly growing city. It may be true that there are very few deaths in his city per 1,000 of the population, but it may also be true that many persons who are ill are taken to the hospital in the older community and die there, so that their deaths are not registered in the place of their residence. It may also be that in the rapidly growing city the population is highly selected, with few old people and few very young children. In order to make an honest comparison of death rates between one community and another, the death rate must be adjusted for residence and corrected for age. The adjustment of death rates for residence, as well as the adjustment of birth rates by residence of the mother, can only be made if the information as to residence is accurately stated on the death and birth certificates. The adjustment for residence is often very great, especially in small cities having large hospitals. In Rochester, Minn., for example, the crude death rate in 1929 was 50.4 per 1,000 of the population. Adjustment for residence reduced this rate to 15.7, or less than one-third. The correction for age is particularly important in rapidly growing industrial cities. The crude death rate in Detroit, for example, is much lower than that in Columbus, O., but after correction for age, the refined rates are found to be almost identical.

A classic example of the misuse of crude death rates is found in the frequently quoted statement that as a result of the work of General Gorgas and his assistants the death rate of the Panama Canal Zone was reduced to less than the death rate in the United States. In a speech at Charleston, S. C., December 16, 1915, General Gorgas made the following statement:

We had on the Isthmus some 10,000 American whites, about one-half of whom were men and the other half women and children. The children were equal in number to the women. The health of these whites was exceptionally good. During 1913 the death rate among the men from disease was about 2.5 per thousand, that among the women and children about 4 per thousand. It would be difficult to find anywhere in the United States in a similar population death rates better than these.

The achievement of the health administration in the Canal Zone in transforming a tropical pest hole into a region in which women and children could live and in which white men could work, did not need any exaggeration, but such statements as those quoted above,

repeated without qualification, are grossly misleading. The facts were that this population was probably the most highly selected group of its size ever brought together in one health administration area. There were no old people and few very young children. All were in the age periods characterized by very low death rates, and furthermore every one who became ill was sent as quickly as possible back to the United States, so that the deaths in the Canal Zone were only those from acute attacks of disease from which death occurred before the patient could be transferred out of the Canal Zone. By 1930 the crude death rate in the Canal Zone had been further reduced to less than half the rate of 1913, but the government even now discourages permanent residence and the report for 1930 of the Health Department of the Canal Zone states that practically all who retire from the service either from disability or age return at once to the United States.

The health officer in the course of his routine work may make use of the crude death rate for the comparison of one month or one year with another in the same area, but for a comparison of different areas, or the comparison of his city with another city, the rates must be adjusted for residence and corrected for age.

For further analysis in large areas, the death rates must be shown for different ages and for different causes of death. These are known as specific rates. Age-specific death rates are shown as the number of deaths of persons of a given age or age period per 1,000 of the population of the same age or age period. Age-specific death rates are high in infancy, low in childhood and in early adult ages, and are very high again in old age. The health officer is mainly interested in the death rates of childhood and middle life. Deaths beyond the age of 50 are usually from degenerative diseases which are largely beyond the control of public health administration.

Specific death rates by cause are usually expressed as the number of deaths from any cause per 100,000 of the population. These rates are sensitive and are particularly valuable as a guide to epidemiologists. Attention can be concentrated on preventable causes, and the trends measured from week to week. Here again comparisons between areas are dangerous without correction for age and residence. The specific death rate from diphtheria, for example, will ordinarily be higher in an area in which 20 per cent of the population is under the age of 10 than in a population with less than 10 per cent in the early age periods.

Infant mortality may be shown as an age-specific death rate for children under 1, or better by a ratio of infant deaths to total live

births. There is no single index of progress in public health more sensitive or more significant than the infant mortality rate based upon the ratio of infant deaths to births. In the good old days before germs were discovered, the mortality of infants was frightful according to modern standards. High as birth rates were in past ages, infant mortality kept the population about stationary. In many communities, less than half of the children born survived their first year. As recently as the generation in which most of us were born, there were more than 150 infant deaths to 1,000 births. In Massachusetts, the infant mortality rate first fell below 150 in 1897. In 1901 it was 138, and in 1909, 127. In 1917, for the first time, the rate was below 100, and in 1931 it was 56. For the entire registration area of the United States the infant mortality rate in 1931 was 62. This rapid reduction in infant mortality is an achievement which can never be duplicated again, for an analysis of infant deaths by cause will show that there are so many deaths from causes which cannot be prevented that infant mortality rates below 40 per 1,000 births cannot be expected except in limited areas in occasional years.

The computation of infant mortality rates depends upon an accurate record of births. The health officer, in his official capacity, may not be directly interested in births, but indirectly his record of births is of greatest importance to him. As has been noted, the number of births is necessary for the computation of the infant mortality rate, and in a general sense he is interested in births as the source of renewal of the population and in the changing birth rate as a means of forecasting the age composition of the population of the future. The crude birth rate, like the crude death rate, is calculated as the number of births per 1,000 of the population. A more accurate measure of the fertility of a population is a refined birth rate obtained first by adjusting births to the residence of the mother and basing the computation not on the population as a whole but on the number of women between the ages of 15 and 45. Still better is the legitimate birth rate based on the number of children born per 1,000 married women between the ages of 15 and 45.

The rapid decline in the birth rate in recent years is as significant as the decline in the death rate. In the "Good Old Days," now happily gone forever, the fate of a married woman was to give birth to a child every year or two until she was worn out and obliged to surrender her place to wife number two. Of 8 to 15 children, perhaps half were "raised" to maturity. The birth rate was probably around 40 per 1,000 and the death rate almost as high. As recently as 16 years ago the crude birth rate in the registration area of the United

States was 25 per 1,000. In 1931 it was 17.8, and it is expected that for 1932 the rate will fall below 17. This is startling enough in itself, but it does not tell the whole story. Because of immigration and the relatively high birth rates of a generation ago, our population in the reproduction age periods is abnormally large. This abnormal age distribution permits the low death rates of recent years, and under ordinary conditions should show a high birth rate. If we make corrections for age, we will find that with births and deaths as they will be recorded for 1932 the completely refined death rate will be higher than the refined birth rate. This means that present refined birth and death rates continue until persons now in middle life become old, the population of the United States, instead of increasing, will begin to decline. The sudden and dramatic change in one generation from a rapidly increasing population to a stationary or a declining population is hard to realize.

With a continuance of present trends, the social problems of the next generation will be vastly different from those of the past. There will be fewer children and more old people, fewer schools and more homes for the aged, fewer deaths from epidemic diseases and more from degenerative diseases. The death rate, now the lowest ever known, will rise again until it reaches the rate of 30 years ago. This rising mortality will be beyond the control of preventive medicine, for the deaths will be from causes which only a fountain of youth can prevent.

The prospect of a stationary population is very alarming to those who fear change, but after all, will it not make for a happier and more prosperous world? Business conditions will become more stable. The needs of the population can be more readily calculated. Social planning will become more practicable. There will be less speculation, particularly in real estate, and less of the ballyhoo of the professional booster.

In the "Good Old Days" we were fatalists. Our attitude was typified by the familiar words "The Lord giveth and the Lord taketh away, blessed be the name of the Lord." In the future the Lord will be relieved of that terrible responsibility. Children will come when they are desired and when born will live out the allotted span of "three score years and ten." Without realizing it, we are moving toward the ideal of a controlled population. The population need not decline. Economic sanctions can be devised which will maintain the birth rate at any desired level. Until some way is found to check the degenerative changes of advancing age, little more can be done to reduce the death rate. The birth rate on the other hand is capable



of reduction to the vanishing point, but at the same time it is responsive to economic conditions.

More than any other person, the health officer is interested in all that vital statistics has to offer. It is on the health officer as registrar that the vital statistician depends for the complete record of births and deaths. The health officer in turn needs vital statistics as a guide to his work and a record of progress. We should not flatter ourselves that all the gains of preventive medicine are secure. Only constant vigilance prevents the return of epidemics against which our population may be losing its immunity. The health officer must use and properly understand the uses and limitations of all the devices of vital statistics, and he should have the benefit of the forecasts of future conditions in his field, which the vital statistician alone can give him.

---

## Maternity Leave in Denmark

THE Danish Women Workers' Union, composed of about 12,000 members, recently adopted a resolution to the effect that the Government and Parliament should be urged to guarantee women workers the payment of their wages in full during a rest period of 6 weeks before and 6 weeks after confinement. At present, women workers in Denmark are entitled to 4 weeks' rest after confinement, together with an allowance payable from public funds, on presentation of a medical certificate, requiring such a rest period.—*Industrial & Labour Information*, XLIV, 6:177 (Nov. 7), 1932.

E. R. H.

# Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine

## With Particular Reference to Swimming Pool Water\*

W. L. MALLMANN, PH.D., AND WILLIAM CARY, JR., F.A.P.H.A.

*Department of Bacteriology, Michigan Engineering Experiment Station,  
Michigan State College; and Detroit Department of Health,  
Detroit, Mich.*

SINCE the adoption of continuous feed chlorination of swimming pool water whereby residual chlorine contents of 0.2 to 0.5 p.p.m. may be maintained irrespective of the bathing load, bacterial quality comparable to drinking water has been obtained. In 1926, Stovall, Nichols, and Vincent<sup>1</sup> reported that the relationship between the bacterial purity of the water and the residual chlorine content as measured by the orthotolidine test was so satisfactory that this test could be depended upon as a measurement of sanitary quality. In the same year Mallmann<sup>2</sup> observed such a close agreement in the bacteriological and the orthotolidine tests that he recommended the latter as the sole measurement of the sanitary quality of swimming pool water. Since then numerous reports have appeared showing the absence of *Escherichia coli* in 50 c.c. of water in swimming pools maintaining a residual chlorine content of 0.2 to 0.5 p.p.m. There has been no occasion to question the reliability of these data, until recently in a series of studies on swimming pools, the writers had occasion to test swimming pool water immediately after it was withdrawn from the pool. In 1930, Schoepfle<sup>3</sup> reported that pool side bacteriological tests and tests on the same stored samples tested later at the laboratory were practically the same. He concluded that

. . . the increment of pollution to the pool water due to swimmers seemed to be handled effectively by maintaining the residual chlorine within proper limits;

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

this sterilizing action on the added pollution by bathers seemed to be practically immediate, at least within the time required for making a rapid plating and tubing, that is approximately one minute.

In a recent series of studies Mallmann and Schalm<sup>4</sup> have demonstrated that increased alkalinities in water cause a marked retardation of germicidal action of chlorine. Gerstein<sup>5</sup> found that chloramine could not be used as a disinfectant in Chicago water because of delayed germicidal action. The fact that this latter treatment, because of its lessened taste and odor nuisances, is rapidly finding favor in swimming pool disinfection, and the establishment of delayed killing action of chloramine and of chlorine in alkaline waters, raised the question of their sanitary value for swimming pools. The sterilization of a swimming pool water is quite different from that of a drinking water. In swimming pool water disinfection the residual chlorine must destroy large numbers of bacteria as they are removed from the bodies of the bathers; otherwise during periods of heavy bathing loads, an accumulation of bacteria would occur and, at least, a temporary period of pollution would ensue.

To study the influence of chlorine and chloramine treatment without the interference of such other factors as filtration and dilution, a fill and draw pool of 45,000 gallons capacity was selected. An attempt to use a circulating system pool gave unsatisfactory results as the circulation introduces factors that are difficult to control. Furthermore, chloramine had not been used in a pool with a circulating system prior to the experiment and the possibility of the filters removing the ammonia lends another unknown factor. There is also some question as to whether or not the ammonia, when once introduced into a closed system such as a circulating system pool, would remain available for further combination with chlorine after it had released its initial load for sterilization purposes. Available data indicate that in such a closed system after the initial treatment with an ammonia-chlorine ratio of 1 to 2 or 1 to 3 subsequent treatments can be reduced to 1 to 10.

To determine the necessity of pool-side testing a bacteriological laboratory was set up in the school readily accessible to the pool. For each test two samples were collected simultaneously, one of which was tested immediately while the other was kept and tested several hours later at the city laboratory. The latter was handled in a manner typical of the customary routine. In Table I are presented results representative of a mass of data collected to measure the comparative

TABLE I  
VALUE OF POOL-SIDE TESTING VS. REGULAR LABORATORY TESTING

Pool—45,000 gal. capacity—fill and draw type					
Treatment—Chloramine					
Bathing — 9:30– 9:50		30 men			
10:15–10:35		37 men			
1:15– 1:35		12 women			
Time of sampling.	Resid. Cl.	Analyses at pool side		Analyses at laboratory	
		Gas in five 10 c.c. samples	Count	Gas in five 10 c.c. samples	Count
9:25	0.15	0 out of 5	0	0 out of 5	0
10:25	0.18	5 out of 5	65	0 out of 5	0
10:50	0.05	5 out of 5	34	0 out of 5	0
1:00	0.25	0 out of 5	19	0 out of 5	0
1:30	0.25	4 out of 5	22	0 out of 5	0
2:30	0.25	0 out of 5	0	0 out of 5	0

value of pool-side and the customary laboratory examinations. In this particular series of tests, the pool received 3 oz. of chlorine and 1.5 oz. of ammonia, a ratio of 2 to 1, prior to the tests. The pool had been previously emptied and cleaned so it was free of organic matter at the start of the experiment. It will be observed that in each case during the period when the pool was in use, marked pollution, as measured by gas production in lactose broth, was obtained in the pool-side samples. The same samples tested at the laboratory in every instance showed no evidence of pollution. In cases of minimum bathing loads and of high residual chlorine contents (0.5 to 1 p.p.m.) pool-side tested samples failed to show pollution. Thus it would seem that under proper conditions, as pertain to bathing load and amount of residual chlorine, a pool can be maintained according to the standard set by the Joint Committee on Swimming Pools and Bathing places of the American Public Health Association and the Conference of State Sanitary Engineers when examined by pool-side testing.

That such a method of testing is logical, is attested by the fact that the presence of even a minimum chlorine residual indicates the presence of germicidal chlorine. If germicidal chlorine is present, it necessarily follows that any bacteria present are going to be affected accordingly. If a period of time elapses between sampling and testing, a reduction of the bacteria must result. Granted a sufficient period and a sufficient amount of residual chlorine, an otherwise polluted sample would be sterile when tested.

In the following studies only the results of pool-side testing will be

reported as, in practically all cases, the samples tested at the laboratory were sterile. Also the presence of streptococci will be reported. The regular Durham lactose broth tubes were examined for the presence of these organisms. The method of detecting streptococci consisted of a macroscopic examination followed by a confirmatory microscopic examination. Macroscopically, a presumptive test for streptococci may be made by holding the suspected tube to the light and examining for a granular precipitate having a close resemblance to the precipitate obtained in an agglutination test. Frequently, a granular floc adheres to the outer sides of the tube and on the outer surfaces of the inverted vial. Although the appearance of the granular precipitate is not always confirmed microscopically, the absence of such granular precipitates does not demand microscopical examination.

Mallmann and Schalm<sup>4</sup> demonstrated in a series of laboratory experiments that increasing alkalinities caused a decreased activity or delayed killing action of chlorine. It will be observed that at the same pH values, a marked similarity exists between chlorine and chloramine in the germicidal activity. That increasing pH values cause a decrease in the germ killing speed of chloramine, as well as chlorine, is demonstrated in Figure I. It will be noted that at pH 6, the killing rate is much more marked than at pH 7.7.

To determine the practical value of chloramine treatment, a fill and draw pool of 45,000 gal. capacity was treated with chloramine using calcium hypochlorite and ammonium sulphate as sources of chlorine and ammonia respectively. Prior to the experiment the pool was emptied and cleaned. One ft. of water was admitted, followed by 12 oz. of ammonium sulphate. After another ft. of water was added, 6 qt. of calcium hypochlorite solution (20 lb. to 20 gal. of water) was introduced. The pool was then filled. The applied chlorine was in the proportion of 1 p.p.m. and the ammonia-chlorine ratio was 1 to 2. Frequent duplicate samples were taken throughout the day during periods of use and rest to obtain a complete picture of the bacterial pollution. One set of

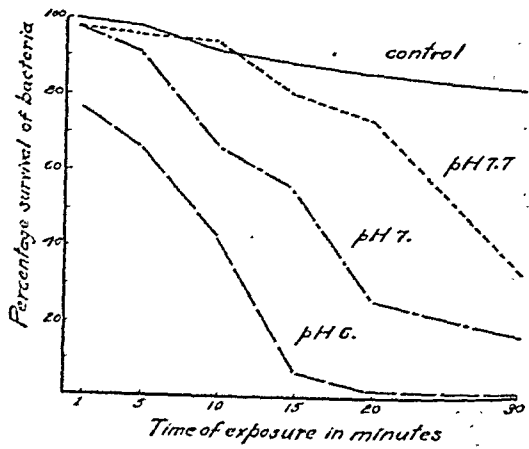


FIGURE I—Influence of varying the pH on a constant chloramine content in killing *E. coli*

samples was tested immediately after collection. The results are presented in Figure II. It will be observed that the colon bacilli indices rise during the period of use and fall during the intervening rest periods; that the streptococci indices follow the same trend as the colon bacilli indices, except that streptococci are less frequent; that the residual chlorine content remains fairly constant although no additions of chlorine were made during the period of the test. During the rest periods between bathing loads, sterilization was not effected although a fall in colon bacilli and streptococci indices is evident. In considering these data it should be remembered that the other set of samples collected in the usual manner and tested later in the city laboratory without exception failed to show either streptococci or colon bacilli in all tubes. It may be concluded from these data that 0.5 p.p.m. available chlorine as chloramine failed to control pollution as measured by colon bacilli and streptococci indices.

The following day, after emptying and cleaning the pool, chlorine treatment was tested under as nearly identical conditions as possible. The pool was treated with 6 qt. of calcium hypochlorite solution (20 lb. to 20 gal. of water) to give an applied dosage of 1 p.p.m. At the start of the experiment the pool had a residual chlorine content of 0.45 p.p.m. The data are presented in Figure III. A similar set of data was obtained during periods of rest, except that greater and sharper falls in pollution indices were obtained. The streptococci and colon bacilli indices follow the same trend; the streptococci, how-

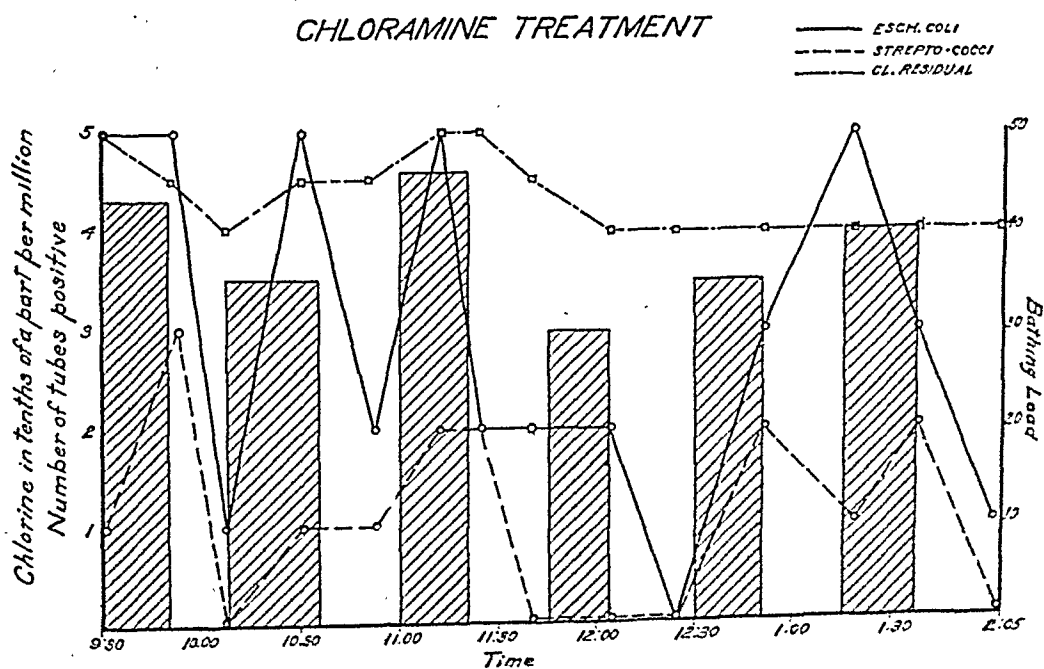


FIGURE II—Relationship of pollution, chlorine residual contents, and bathing load in a chloramine treated swimming pool

ever, having a lower incidence. The residual chlorine content fell rapidly and it was necessary to make additions to keep it above 0.2 p.p.m.

It will be observed that as the residual chlorine content falls a marked increase in colon bacilli and streptococci indices occurs. Recovery after pollution was always very rapid. In other tests not presented, under conditions as above, sterility generally occurred within 10 minutes after the bathers had left. This was not true with chloramine treated pools or chlorine treated pools with alkalinities of pH 8.

In the studies cited, the incidence of colon bacilli was considerably higher than that of streptococci. That this relationship is not always true is shown in Tables II and III. These samples were obtained

TABLE II

COMPARISON OF CHLORINE AND CHLORAMINE TREATMENT OF SWIMMING POOL WATER

Treatment—Chloramine—0.1 p.p.m.  
Reaction—pH 7.8  
Bathers—247

Sample No.	Gas in lactose broth						Streptococci						Count	Organism
	10	10	10	10	10	1	10	10	10	10	10	1		
1	+	+	+	+	—	—							Inn.	<i>A. aerogenes</i>
	+	+	+	+	—	—	+	+	+	+	+	+		
2	+	+	+	—	—	+							Inn.	<i>A. aerogenes</i>
	+	+	+	—	—	+	+	+	+	+	+	—		
3	+	+	—	—	—	—							Inn.	<i>A. aerogenes</i>
	+	+	+	—	—	—	+	+	+	+	+	—		

Treatment—chlorine—0.1 p.p.m.  
Reaction—pH 7.3  
Bathers—283

Sample No.	Gas in lactose broth						Streptococci						Count	Organism
	10	10	10	10	10	1	10	10	10	10	10	1		
1	+	—	—	—	—	—							40	<i>E. coli</i>
	+	+	+	—	—	—	+	+	+	+	+	—		
2	—	—	—	—	—	—							25	
	—	—	—	—	—	—	+	+	+	+	+	+		
3	—	—	—	—	—	—							350	
	—	—	—	—	—	—	+	+	+	+	+	+		

from a 260,000 gal. out-door pool with a recirculation system. In Table V, are shown the results obtained on successive days, using chloramine treatment and chlorine treatment with residual chlorine contents of 0.1 p.p.m. in both cases. All samples were collected during periods when the pool was in use. Although the numbers of colon bacilli were far less in the case of chlorine treatment there was no change in the incidence of streptococci. Table III gives

TABLE III  
COMPARISON OF CHLORINE AND CHLORAMINE TREATMENT OF SWIMMING POOL WATER  
Treatment—chloramine—0.6 p.p.m.  
Reaction—pH 7.6  
Bathers—740

Sample No.	Gas in lactose broth					Streptococci					Count	Organism
	10	10	10	10	10	10	10	10	10	10		
1	—	—	—	—	—	—	—	—	—	—	32	
2	+	+	—	—	+	+	+	—	+	+	226	<i>A. aerogenes</i>
3	+	+	—	—	+	+	+	+	+	+	41	

Treatment—chlorine—0.6 p.p.m.

Reaction—pH 6.9

Number of bathers—273

Sample No.	Gas in lactose broth						Streptococci						Count
	10	10	10	10	10	1	10	10	10	10	10	1	
1	—	—	—	—	—	—	+	+	—	+	+	—	0
2	—	—	—	—	—	—	+	—	+	+	—	—	0
3	—	—	—	—	—	—	+	—	—	—	—	—	0

the data obtained from the same pool using 0.6 p.p.m. available chlorine in the case of both chlorine and chloramine.

In this case, colon bacilli were absent from the chlorine treated water and a marked reduction in the number of streptococci occurred. It may be stated, however, that both colon bacilli and streptococci follow the same trend as a measurement of pollution in a chlorinated pool. Their relative relationship as to numbers apparently varies. Insufficient data on this particular point make any explanations impossible.

The writers are not prepared to weigh the significance of the colon bacilli and streptococci as found by means of the pool-side testing during periods of use of the swimming pool. Whether or not the pollution found has any sanitary significance remains to be seen. It is true, however, that the usual method of testing, whereby samples are held for a period of time between collecting and testing, does not give a true picture of the sanitary quality of a swimming pool. Such methods of testing as are now in general use are to be condemned as giving a false sense of security if we are to consider the presence of the colon bacilli and streptococci as a criterion.

The disappearance or loss of residual chlorine varies with the conditions under which the chlorine is introduced. A number of investi-



gators have reported that chloramine treatment stabilizes the residual chlorine content. To obtain confirmatory data upon this point, residual chlorine contents were observed under 3 conditions, namely, high alkalinity (pH 7.3-7.9), neutral reaction (pH 6.8-7.2), and chloramine treatment (pH 7.2). The data are presented in Table IV. In the case of the chloramine treatment, although only an initial dose of calcium hypochlorite was made, the residual chlorine content remained practically constant. With chlorine treatment at pH 6.8 to 7.2, 33 per cent more chlorine was necessary to retain a minimum dose in excess of 0.2 p.p.m. available chlorine with a considerably smaller bathing load. With chlorine treatment pH 7.3 to 7.9, the chlorine loss was not as great as pH 6.8 to 7.2 but more so than with chloramine treatment. However, although delayed killing action occurred, the extent of pollution during periods of use was far less than with chloramine treatment. On the other hand, the chloramine treated pool with an average residual chlorine content of 0.45 p.p.m. showed marked pollution during periods of use as measured by pool-side testing. The stability of chlorine residuals in chloramine treated pools has little value if the sanitary quality of the pool is sacrificed. Examination of 3 chloramine treated pools with chlorine residuals of 0.1 to 0.6 p.p.m. has failed to show the desired sanitary quality as measured by pool-side testing.

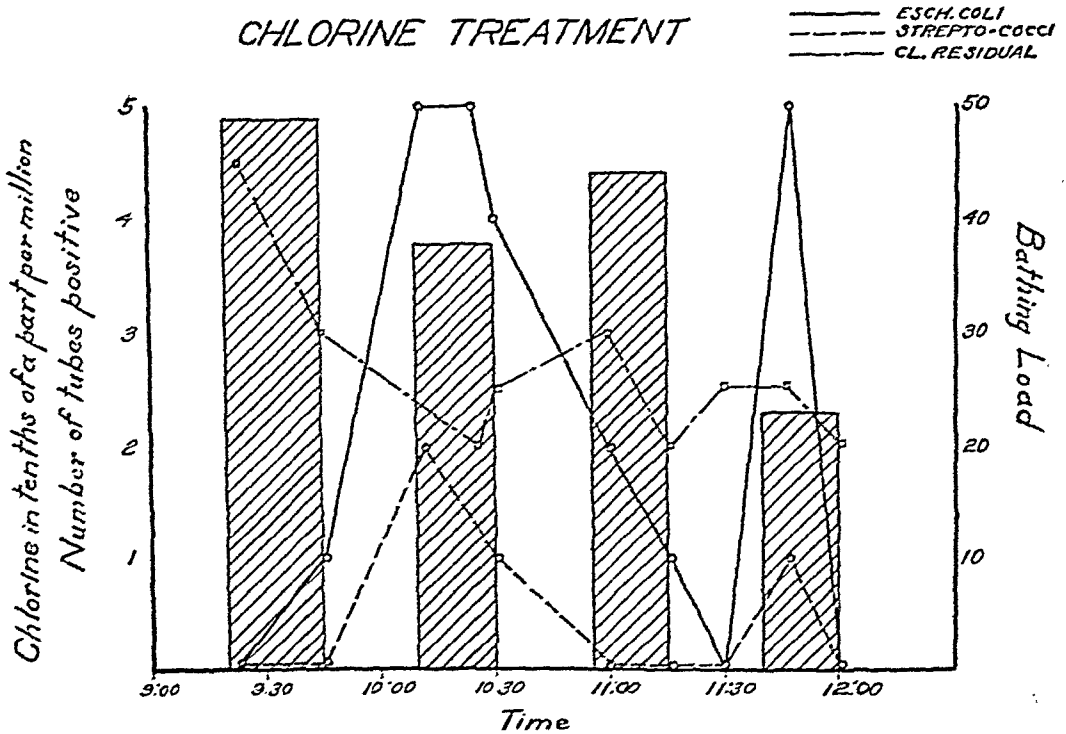


FIGURE III—Relationship of pollution, chlorine residual contents, and bathing loads in a chlorine treated swimming pool

## STABILITY OF CHLORINE IN ALKALINE CHLORINE, NEUTRAL CHLORINE AND CHLORAMINE TREATED POOLS

The writers feel that the present method of sampling should be supplanted by a method of pool-side testing. Pool-side testing is, of course, out of the question as a routine procedure, but a method of collecting samples in sodium thiosulphate treated bottles makes possible the elimination of the residual chlorine so that the sample can be transported to the laboratory without destruction of the bacteria.

The bottle is prepared by adding a small crystal of sodium thiosulphate to a moist bottle or 0.5 c.c. of tenth normal sodium thiosulphate to a dry bottle subsequent to sterilization by moist heat. Care must be taken not to rinse the bottle in collecting the sample. The sodium thiosulphate added is sufficient to neutralize a residual chlorine content of at least 1 p.p.m. The results obtained from sodium thiosulphate treated bottles and from pool-side tested samples are similar.

Samples collected from chlorinated swimming pools should be taken during use to determine the presence of transient pollution. Samples taken during periods of rest will, if collected 15 to 30 minutes after use, generally fail to show pollution. All samples should be collected in sodium thiosulphate treated bottles.

The building up of pollution in the swimming pool in the presence of residual chlorine would seem to indicate that bathing loads should be regulated to avoid excessive pollution. The view that the presence of residual chlorine indicates the absence of bacteria must be revised.

Further work on this phase of the problem is in progress in a number of swimming pools in Detroit and Lansing.

This report is very largely of a preliminary nature and will be followed by reports on more complete studies.

#### SUMMARY

1. Samples of swimming pool water collected during periods of use and tested immediately showed more pollution than duplicate samples handled in the usual manner by storing and testing later.

2. During periods of use, swimming pool water showed marked pollution as measured by colon bacilli and streptococci indices in the presence of residual chlorine contents of 0.2 to 0.5 p.p.m.

3. During periods of rest, the pollution evidenced during use, disappeared. The rate of disappearance depended upon the type of treatment used.

4. With chloramine treatment, a delayed germicidal action occurred. This was also true of chlorine treatment in alkaline water, but to a lesser extent.

5. The colon bacilli and streptococci indices roughly parallel each other. The preponderance of the colon bacilli and streptococci incidences varies.

6. A sodium thiosulphate treated sample bottle is recommended for collecting pool samples.

#### REFERENCES

1. Stovall, W. D., Nichols, M. S., and Vincent, V. E. Renovation in Swimming Pool Control. *A. J. P. H.*, 16, 3:237 (Mar.), 1926.
2. Mallmann, W. L. The ortho-tolidine Test for Free Chlorine as an Indicator of Safety in the Swimming Pool. *Ann. Rep. Mich. State Bd. of Agri.*, 1927, p. 293.
3. Schoepfle, O. F. Time Factor in Chlorine Sterilization of Swimming Pool Water. *10th Ann. Rep. Ohio Conference in Water Purification*, 42, 1930.
4. Mallmann, W. L., and Schalm, Oscar. The Influence of the Hydroxylion on the Germicidal Action of Chlorine in Dilute Solutions. *Mich. Eng. Exper. Sta. Bull.* 44, 1932.
5. Gerstein, H. H. Bactericidal Efficiency of the Ammonia Chlorine Treatment. *J. Am. Water Works Assn.* 23:1334, 1931.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZŮCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMAN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD

GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## PREVENTION OF RICKETS

THE prevention of rickets is a very live question in spite of the fact that with direct irradiation, ultra-violet rays, cod liver oil or its concentrates, Haliver oil, viosterol, activated milk, etc., we have more specifics for it than for any other single disease. It is, however, extremely prevalent, even in quarters where it would be least suspected.

There is a growing feeling that some form of antirachitic milk is the best preventive as well as curative, since it has the marked advantage of a high content of calcium and phosphorus. Another point which has been brought out before, but was emphasized by several speakers in the recent symposium at our 61st Annual Meeting, is that the results of standardization of antirachitic agents as units per c.c. or per quart, does not accord with clinical experience. Much more viosterol is needed to protect infants than would be expected from the assays on rats. Several of the speakers, led by Hess, pointed this out. There is no doubt that the estimation of human dosage on the basis of rat assays is fallacious when compared with clinical results, though until the work of Hess and Lewis appeared, these biological assays entirely overshadowed clinical data, which after all constitute the essential criterion.

There are a number of ways of increasing the antirachitic potency of milk. One which seems to be favored by Hess<sup>1</sup> above others is the feeding of activated yeast to the milch cows. He considers it

especially applicable to certified dairy farms, since one can be sure of the quality of the yeast used, the ration fed, and frequent biological assays of the milk. For the general supply of large communities, the method does not seem applicable at present. However, irradiation of the milk can be carried out at a central station. An exposure of 16 seconds to certain carbon arc rays is sufficient for the purpose, and this does not develop any bad odors or tastes, nor are the vitamins injured. Extensive experiments over two winters in New York has shown that such irradiated milk will prevent rickets practically without exception, even in negro infants, who are particularly susceptible. The amount of milk fed these infants was only  $2/3$  quart daily, instead of the quart usually recommended.

Hess further points out that laboratory experiments show that a greater number of antirachitic units are required when viosterol is given than when cod liver oil is used, and has suggested that in addition to vitamin A, cod liver oil contains something of value against rickets which is not present in irradiated ergosterol. He believes that we should be guided by the clinical activity of our antirachitic agents instead of depending too much upon the laboratory assay. He supports strongly the use of activated milk, fluid or dry, since it has the advantage of providing an automatic method for the prevention of rickets, supplies the essential factor in a medium rich in phosphorus and calcium, and the results are obtained by means of an exceptionally small amount of the antirachitic factor.

Another paper<sup>2</sup> given in the symposium reported on milk irradiated with the carbon arc lamp, milk from cows fed irradiated yeast, and from cows irradiated directly with the carbon arc lamp. The results were closely comparable with these obtained by Hess. Clinical studies on infants in a large foundling home over a period of nearly 8 months were entirely satisfactory, and in two other hospitals, children with marked rickets were treated with prompt cure in every instance.

The direct irradiation of cows with the carbon arc lamp is carried out by placing a lamp between pairs of cows so that only one side of the udder and abdomen are irradiated. The type of lamp used is the same as for the direct irradiation of fluid milk. The experiment so far has included 50 cows. Each was irradiated for 15 minutes daily, and the treatment was begun 2 weeks before the milk was used. These experiments have gone on for 9 months. The results on 21 infants over a 6- to 8-month period practically parallels those produced by irradiated fluid milk. The authors believe that irradiation of the cow has certain advantages over the irradiation of fluid milk,

and that it can be used not only in herds producing certified milk, but those of smaller communities. They also believe that it is considerably cheaper than other methods for institutions which care for a large number of infants.

Another paper<sup>3</sup> in the symposium gave the results of experiments which have been going on at Columbia University for several years; namely, the purification and improvement of a concentrate from cod liver oil which contains the antirachitic element. This concentrate, in the proportion of 1 part to 12,000 of milk, will give practically 150 units of vitamin D per quart, equivalent to 3 teaspoons of cod liver oil. The concentrate may be added in several different ways, but the one apparently preferred by Zucker is to add it to the cream, pasteurize the milk, and recombine the two. Only 15 experiments on rachitic infants have been carried out by this method so far, but the results were entirely favorable and comparable to those obtained by a dosage of 3 teaspoons per day of cod liver oil. The author believes that this offers perhaps the best and safest method, since the concentrates are carefully assayed, and there is no possibility of accidental overdosage. So far, one dairy has been licensed to produce such milk, and the additional cost is said to be 1/25 cent per quart.

Some authorities object to what they call doctoring milk, and at present the addition of foreign material will probably meet with some opposition from the authorities carrying out the pure food laws, but if it is shown to be better than other methods, these laws can be changed.

This symposium contains much food for thought, and through the labors of these experts, we have learned of a practical method for the prevention of the widespread disease, rickets.

#### REFERENCES

1. Hess, Alfred F. The Rôle of Activated Milk in the Anti-Rickets Campaign. *A. J. P. H.*, 22:1215 (Dec.), 1932.
2. Mitchell, John McK., *et al.* Protective Value for Infants of Various Types of Vitamin D Fortified Milk. A Preliminary Report. *A. J. P. H.*, 22, 12:1220 (Dec.), 1932.
3. Zucker, Theodore F. Questions Pertaining to Vitamin D as Found Naturally and the Irradiation Products. *A. J. P. H.*, 23, 1:10 (Jan.), 1933.

#### MOTTLED ENAMEL

WE wish to call attention to a situation in connection with public health activities which in some respects has unique features. Some years ago it was found that the permanent teeth of all the children born in Chetopa, Kansas, were afflicted with what is known as "mottled enamel." Recent investigations have shown that this

pathological condition, which occurs in many districts of the United States, is induced by the presence of fluorine in the drinking water. The water of the artesian well which supplies Chetopa was found to contain over 9 parts per million of fluorine, an amount which invariably leads to damaging and disfiguring lesions of the dental enamel.

For several years Dr. J. Scott Walker, a practicing dentist in that city, called public attention to the dangers of the situation with the result that it was proposed to bond the city to the amount of \$25,000 for a new water supply which would be free from fluorine. Last August this proposal was voted on but defeated, which meant that the dental defects would continue to develop in succeeding generations. Dr. Walker has continued his agitation and has brought it about that the monthly water bills bear the legend: "This water is unfit for consumption by children." It is clear that the matter is by no means settled.

This incident is of interest to public health authorities, not only because the officials of this community decided to save money rather than to eradicate a menace to the health of the community, but even more so because it illustrates what can be done by an energetic and persistent individual in the face of a lack of coöperation. The ingenious method of calling direct attention of the residents to the limitation in potability of the water might be of service to others who are concerned with similar problems.

### BERNHARD BANG

FROM Europe comes the notice of the death of Bernhard Bang, one of the leading veterinarians of his time, in his 85th year.

The announcement of the discovery of the tubercle bacillus by Koch came 2 years after his graduation in veterinary medicine. He was one of the early converts to the science of bacteriology and carried out researches on many of the infectious diseases of domestic animals, two of which at least are known to be communicable to man—tuberculosis and bovine abortion. He devoted a great deal of time to the study of the eradication of bovine tuberculosis from cattle, and in 1894 put forth the method known by his name for converting a diseased herd into a healthy one, based on the knowledge that tuberculosis is not an inherited disease. His plan was to separate the newborn calf from the diseased mother within 48 hours of birth, and rear it on milk from a healthy nurse mother, or else on pasteurized milk.

When the diseased cattle had open tuberculosis and were dangerous spreaders of the germ, they were slaughtered. The method required a clean barn free from infection in which the new-born calves were reared, and kept when grown, the diseased cattle being housed in a separate building and gradually sold or killed. The method was successful, but has not been largely adopted in the United States on account of the expense. Bang and Nocard were the first two to inoculate cattle with emulsions of the tubercle bacillus intravenously, the animals being slaughtered within an hour and the tissues examined for the germ of tuberculosis. Their experiments were negative. The object was to determine whether or not the eating of meat from tuberculous animals was dangerous to man.

The second discovery of Bang was that of the germ of contagious abortion, described in 1897. He did not recognize it as being related to the bacillus of Malta fever, isolated by Bruce some 10 years before, but, in 1918, Alice Evans, of the Hygienic Laboratory of the U. S. Public Health Service, now the National Institute of Health, showed the close relationship between the two organisms. Since that time it has been found that the disease is quite widely spread. A number of outbreaks in cattle have occurred, and a considerable number of cases of undulant fever due to the organism have been observed in man.

Bang was born in Zealand, educated there and at Copenhagen. He was appointed Professor of Internal Diseases in the Royal Veterinary College in Copenhagen in 1892, and retained the chair until 1914. We owe much to veterinary science in the development of bacteriology and the study of disease of animals transmissible to man, and to Bernhard Bang, our debt is especially heavy.



## ASSOCIATION NEWS



WILLIAM HALLOCK PARK, M.D.

WILLIAM Hallock Park has been awarded the Sedgwick Memorial Medal for distinguished service in public health. The choice was unanimous and enthusiastic, and the announcement at the Washington Annual Meeting was greeted with hearty and spontaneous applause. Dr. Park's work and accomplishments had placed

his name in the hall of fame long before this recognition of his achievements. It is given to few men to serve so long and so well. For 39 years Dr. Park has been Director of the Bureau of Laboratories of the Department of Health of the City of New York. He was a pioneer in bacteriology and was of the vanguard in the march of

progress in the practical applications of immunology.

There is not a single disease on our list of communicable infections to which Dr. Park has not made notable contributions, especially in the matter of laboratory aids to diagnosis, and where biologic preparations helpful in prevention or cure were concerned. His contributions to the scientific side of hygiene and sanitation have constituted him an authority and given him world-wide recognition. His profound knowledge of the subject, his rich background of experience, his critical insight, and unusual fund of common sense have made him a guide as well as an authority in sound public health practice. Dr. Park is an able teacher,

a prolific author, a stimulating investigator, and an inspiring leader. He has dedicated his life to work for the betterment of mankind. His kindly disposition, great patience, and fine qualities have made him a man among men. He is loved by his many friends. In honoring him the American Public Health Association honors itself. Dr. Park, enshrined in the hearts of his colleagues, takes an abiding place as a fixed star of first magnitude in the galaxy of preventive medicine.

He has been a member of the A.P.H.A. since 1912, and is a Charter Fellow, elected in 1923.

M. J. ROSENAU, *Chairman*  
Sedgwick Memorial Medal Committee

### LONG AND CONTINUOUS SERVICE

THE JOURNAL gladly notes the long period of continuous health service of Dr. G. D. Lummis, Health Officer of Middletown, Ohio. Dr. Lummis was appointed part-time health officer of this city in May, 1890, and has served continuously as health officer since that time. In 1927 when the population of the city reached 30,000, the position of health officer was placed on a full-time basis.

Dr. Lummis's experience has been utilized also in state and national health organizations. As an early member of the Committee on Administrative Practice of the American Public Health Association, he participated in the first conferences arranged to prepare the appraisal form for city health work. In 1917, Dr. Lummis was appointed to the Ohio State Health Council and still serves.

In commenting upon his administrative health experience, Dr. Lummis states that he has never attempted a

new departure without the advice and approval of the local medical profession. He believes that "no efficient piece of public health work can be accomplished without the coöperation of the medical profession." He also believes that no health department can carry on successfully without a sufficient number of good public health nurses, and he prefers the generalized plan of organization, which is carried out in Middletown.

Under the Health Officer's direction, Middletown has for 11 years maintained a Fresh Air Camp, financed by a private organization. Here 80 children of ages 8 to 12 are cared for each summer for a period of 10 weeks. The camp is of modern construction and has permanent buildings, a sewage disposal plant, city water supply, and all the facilities of a complete camp. During the past summer the average gain in weight per child was 5.8 pounds.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

*Health Officers Section*

- R. Dow Collins, M.D., Whitesburg, Ky.,  
Director, Letcher County Health Department
- Frederick T. Fitch, M.D., 43 Main St., East Hampton, Conn., Health Officer
- J. Norman Henry, M.D., 1906 Spruce St., Philadelphia, Pa., Director, Dept. of Public Health
- Clarence R. Hepler, M.D., Court House, Wichita, Kans., County Health Officer
- Clarence S. Morse, Board of Health, Amesbury, Mass., Agent, Board of Health

*Laboratory Section*

- Elfreda L. Caldwell, S.B., Andalusia, Ala.,  
Director, Field Research Laboratory, State Department of Health
- Ruth T. Humiston, A.B., Hurlock, Md., Assistant Bacteriologist, State Department of Health
- Charles A. Stuart, Ph.D., Brown University, Providence, R. I., Professor of Bacteriology

*Public Health Engineering Section*

- Frank S. Tainter, 142 Maiden Lane, New York, N. Y., Engineer, New Jersey State Department of Health

*Industrial Hygiene Section*

- Michael A. Eiben, 4587 S. Hills Drive, Cleveland, O., Dust Collecting Engineer, Northern Blower Co.
- Harold H. Keller, 1835 Arch St., Philadelphia, Pa., Medical Department Manager, Bell Telephone Company of Pa.

*Child Hygiene Section*

- Harrison W. Ferguson, D.D.S., 347 Fifth Ave., New York, N. Y., Author and Lecturer (Assoc.)
- Elba L. Morse, R.N., Marquette, Mich., Supt., Northern Michigan Children's Clinic
- Laura B. Wilson, R.N., 125 De Soto St., Pittsburgh, Pa., Supt. and Director of Nursing, Children's Hospital of Pittsburgh

*Public Health Education Section*

- Mary Bottje, A.B., 190 Jordan Hall, Ann Arbor, Mich. (Assoc.)
- Eunice E. Fetterly, A.B., 711 Arch St., Ann Arbor, Mich., formerly Instructor in

Hygiene, North Carolina College for Women

- Marie P. Hart, M.A., 15 Greenwood Ave., Bethel, Conn., Public Health Nurse
- Dorothy M. Henderson, M.D., Van Hornesville, N. Y., Medical School Supervisor
- Anna L. Ketch, R.N., 10 Park Place, Morristown, N. J., Director, Morris County Tuberculosis Assn.
- Cornelia McKinney, M.A., 1527 Avenue J, Huntsville, Tex., Teacher, Biology Dept., Sam Houston State Teachers College
- Francina McMahan, 88 9th St., Glendale, W. Va., County Health Nurse
- M. Nadkarni, M.B.B.S., Ann Arbor, Mich., Student (Assoc.)
- Joseph E. Ransdell, LL.D., 1381 National Press Bldg., Washington, D. C., Executive Director, Conference Board, National Institute of Health
- Mrs. Inez G. Richardson, 5122 Interior Bldg., Washington, D. C., Administrative Assistant, White House Conference on Child Health and Protection

*Public Health Nursing Section*

- Helen Bean, R.N., 2 Park Lane, Mt. Vernon, N. Y., Nursing Field Representative, Amer. Red Cross
- Margaret A. Bulkley, R.N., City Hall, 241 W. South St., Kalamazoo, Mich., Supervisor of Nurses
- Margaret L. East, R.N., State Board of Health, 532 W. Main, Louisville, Ky., Director, Bureau of Public Health Nursing
- Kathleen M. Leahy, A.B., 901 W. Franklin St., Richmond, Va., Professor of Public Health Nursing, College of William and Mary
- Mary I. Mastin, R.N., 722 State Office Bldg., Richmond, Va., Director, Bureau of Public Health Nursing
- Gertrude Osborne, R.N., 31 Church St., New London, Conn., Supervisor, Visiting Nurse Assn.

*Epidemiology Section*

- Filip C. Forsbeck, M.D., Lansing, Mich., Epidemiologist, State Dept. of Health
- NeoKarl Yang, M.D., Dept. of Health, Shanghai, China (Student at Johns Hopkins—Assoc.)

## LETTER TO THE EDITOR

TO THE EDITOR:

CLEANLINESS Institute has been added to the list of organizations which have become victims of the prolonged economic depression. On December 14, at the 1932 Annual Meeting of the founders and supporters, the Association of American Soap and Glycerine Producers, Inc., it became evident that no new money for a third 3-year agreement, not even for a 1-year-1933 budget, was available from the member companies. So, on the basis of a decision by the Board of Directors, plans were immediately made to discontinue Institute professional activities and disband the staff.

On December 15, all full-time members of the Institute staff and office force—48 in number—were assembled by the general manager of the Soap Association, who regretfully gave all present notice of dismissal. It is expected that the exodus of staff will be completed January 15, 1933, by which time the health, school, industrial, and editorial services will have wound up their respective work.

From the beginning, the Board of Directors of Cleanliness Institute gave its professional staff freedom of action in dealing with cleanliness in relation to other subjects. As a staff, we saw very little of these, our generous supporters, for their meetings were infrequent and

brief. We believed in our work and are deeply sorry that economic circumstances make continuance without interruption impossible.

During the life cycle of 6 years the professional staff of the Institute received from health and education leaders all over the country many evidences of friendliness, encouragement, appreciation, and interest in this large scope experiment in cleanliness. We are already somewhat scattered, but if my associates knew I was taking this means of thanking the thousands of health officers, public health nurses, and others, with whom I, myself, have been in touch during this period, I am sure they would join me in this expression of gratitude.

At the same time, in this public way, I would like to pay tribute to my former associates in Cleanliness Institute. Most of their names are already familiar to many of the readers of this JOURNAL. They include in the Health and School Service, Julia B. Tappan, Mary P. Landrine, C. Margaret Munson, Evelyn R. Noé, Lillian Peltz, and Anne Raymond; in Editorial Service, Florence M. Seder, Helen B. Ames, Diana Erler, and Josephine Nelson; in Industrial Service, Nelson N. Marshman; in Administration, Roscoe C. Edlund.

W. W. PETER, M.D., DR.P.H.

# PUBLIC HEALTH ADMINISTRATION

**Anderson County (S. C.) Health Unit**—Within 30 days following the completion of its fiscal year on October 1, the Health Unit has distributed an annual report which pictures the progress of health work in this area during the past 10 years with particular reference to the reduction in the prevalence of smallpox, typhoid fever, diphtheria, and pellagra.

This County Health Department boasts of a personnel of 3 individuals: 1 physician, 1 public health nurse and 1 stenographer. In 1932 the amount appropriated was \$6,000, only 7 cents per capita.

The number of reported cases of smallpox has steadily decreased with the increase in the number of vaccinations. Last year no case of smallpox was reported. During the 10-year life of the Health Unit 20,664 smallpox vaccinations have been performed. There have also been 78,220 typhoid inoculations with a steady decrease in the morbidity rate. With the protection of 4,289 children the diphtheria death rate has been reduced by 50 per cent. Sanitation, malaria control work, supervision of dairy farms, and maternity and infancy hygiene have received particular emphasis.—Anderson County Health Unit, S. C., 1932.

**Rockefeller Foundation**—During 1931 the Foundation has extended its coöperative services for the control of disease, not only by supporting research and epidemiological studies but more especially has directed its effort toward extending knowledge concerning the cause of illness. In this work assistance has been granted to 47 countries throughout the world and the health

departments of 37 states have been aided. Assistance has not been limited to central health services but has also been granted to local authorities.

To the Health Organization of the League of Nations contributions have been made to assist in the international interchange of public health personnel and to maintain a world-wide system of health statistics. Among the special activities may be mentioned those in connection with tuberculosis, respiratory diseases, undulant fever, and special studies of sanitation and administrative service. Noteworthy in the field of research is the work on hookworm, malaria, and yellow fever.—The Rockefeller Foundation, *Annual Report*, 1931.

**Medical Participation in School Health Service**—Recently, the Detroit Department of Health has been compelled to exercise several economies in its program due to the inability of the city to provide all of the funds appropriated for the current fiscal year. The two services which have been eliminated are the School Dental Service and the group of part-time physicians who performed the physical examinations for school children. The dental service has been reëstablished in two ways: In the first place the Children's Fund of Michigan has appropriated \$25,000 with which to maintain an emergency dental service in the school clinics, and, second, the District Dental Society, through a group of volunteer dentists, has provided a dental examination for school children and is manning the central clinic of the Department of Health.

Through the coöperation of the

Wayne County Medical Society, there are approximately 100 physicians who are giving 2 hours every other week for physical examinations for children in the public and parochial schools. Of special note is the fact that the Board of Education has officially designated the Medical Society as an agency to coöperate with the Health Department in providing such examination. The Director of the School Health Service of the Health Department is Secretary of a sub-committee of the County Medical Society which directs the service.

As a means of carrying on during the emergency created by the depression, this plan has proved highly satisfactory and has stimulated a further interest on the part of the physician in the program of medical participation in health work. Through this coöperative plan more and more physicians are becoming impressed with the need of health service for school children and are assuming greater interest in the plan for periodic health examination to be conducted among their own clientele.

**A Revenge Epidemic**—The Greenville, S. C., health officer recently recorded an epidemic of vomiting, involving hundreds of cases reported by physicians, each case being attributed to the ingestion of sandwiches containing mayonnaise from a single shop. Symptoms included nausea, vomiting from 20 minutes to 3 hours after eating, abdominal cramps or dull aches of varying duration, with occasional cases of diarrhea. The patients were ill for 1 or 2 days.

Epidemiological studies and inspections, coupled with laboratory tests, revealed an interesting course of events. Until 2 weeks prior to the trouble, Mrs. A and Mrs. B had conducted a sandwich shop in partnership. Disagreement terminated the partnership and caused Mrs. B to open a shop in competition next door to Mrs. A. Evidence

was secured that Mrs. A had been seen in Mrs. B's plant without permission or knowledge of the owner. Among several cans of cottonseed oil in good condition was found one can which contained fish oil. It was also established that the contents of this can had been used for the manufacture of mayonnaise used in the sandwiches in question, the strong odor not having been detected by the workers until after the epidemic.

Laboratory examination of the mayonnaise and oil revealed a glucose-fermenting motile bacillus which was identified as *Bacillus enteritidis*. It was concluded that Mrs. A desired revenge, substituted fish oil for cottonseed oil, hoping to create a bad taste in Mrs. B's mayonnaise. The fish oil was made from fish heads and tails, by-products of the fishing industry, providing a habitat for organisms of the enteritidis family.—Irving S. Barksdale, M.D., *South. Med. & Surg.*, Charlotte, 94, 10 (Oct.), 1932.

**A Recreation and Health Project**—The Bellevue-Yorkville Health Demonstration Center has coöperated since 1927 with local agencies, including the National Safety Council, in the development of a recreation program for the district where fatal accidents were high, especially among children under 15 years. Increased recreation facilities were developed, and grade school buildings were opened as vacation playgrounds. The yard playground, utilizing space in sections where large grounds are too costly, has proved of value but difficult to administer. Day outings for children, when conducted regularly and scheduled for places not too crowded, proved beneficial.

Auxiliary play services in clinics demonstrated the possibility of making children's waiting rooms attractive to the child. Volunteer service in supervising the use of toys and talking with

mothers regarding children's play habits became a useful supplement to health education given to mothers and children by the clinic nurse. A safety patrol plan proved successful in the majority of playgrounds. Educational material consisting of display posters, pamphlets, and project suggestions were helpful to playground directors.—Thelma E. Carpenter and Savel Zimand, *Recreation Program of the Bellevue-Yorkville Health Demonstration, 1927-1930*, New York, 1932.

Bridgeport, Conn.—In the 1931 report of the city health department

(population 147,101), attention is directed to a decrease in diphtheria from 254 cases and 18 deaths in 1925 to 32 cases and 1 death in 1931. In 1925 there were 143 cases of diphtheria admitted to hospital as contrasted with 26 in 1931. In 1922, hospital days (3,095) for diphtheria amounted to 23 per cent of the total days for all admissions (average 17 days each), while in 1931, only 1.4 per cent of the communicable disease hospital days were for diphtheria (313 days, average 12 days). Last year, 182 scarlet fever cases averaged 26 days in hospital.—*Bridgeport Municipal Register*, 1931.

## LABORATORY

### REPORT OF THE REFEREE ON OYSTER ANALYSIS\*

THE last report of the Committee on Standard Methods for the Bacteriological Examination of Shellfish was presented and adopted in 1920, and was printed in *The American Journal of Public Health*, Vol. xii, p. 574 for July, 1922.

Since that time the method recommended has been in general use in all parts of the country. The very fact, that in the past 10 years there has been no general criticism or demand for change, indicates that on the whole the method has proved eminently satisfactory.

Of course many studies have been reported of other methods of examination than those recommended in Standard Methods. None of these however, has been as simple for general routine work, and none of them seems to give a more accurate determination of the actual sanitary condition of the oysters.

The two main questions that have been raised by these investigators are, first, the method of securing samples of the shell liquor, whether by the ordinary process of opening with a knife thrust in between the shells, or by drilling through the shell; and second, whether the analysis of the shell liquor gives a true measure of the presence of the coli-aerogenes group in the oyster.

On the first point it may be said that in most laboratories where oysters are examined, the workers find little difficulty in draining the shell liquor from the oyster by prying the shells slightly open with a regular oyster knife. The method is rapid, the liquor is not easily contaminated, and it requires a minimum of apparatus and sterilized equipment. Where many specimens are to be analyzed in a day the saving of time is important.

On the second point numerous investigations have shown that practically nothing is gained by attempting to get at the stomach and intestinal contents in addition to the shell liquor. If mem-

\* Presented to the Committee on Standard Methods of the Laboratory Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

bers of the coli-aerogenes group are present anywhere in the oyster they will always be found in the shell liquor.

It is important, however, to prevent as far as possible the dilution of the shell liquor with the sterile blood of the oyster. If the shell liquor only is drained from the shell and the knife is not allowed to cut into the body, in an effort to cause a greater flow of fluid, this will be avoided. We have suggested below a slight change in the wording of Standard Methods to call attention to this.

In view of the fact that a considerable number of laboratories are now engaged in the analysis of other shellfish than oysters, such as clams, quahaugs, mussels, etc., and that methods applicable to oysters are not always suited to these other shellfish, it is recommended, first that the title of this particular part of Standard Methods be changed from "Standard Methods for the Bacteriological Examination of Shellfish" to "Standard Methods for the Examination of Oysters," and second that a sub-committee be appointed to draw up methods for the examination of these other shellfish.

Below you will find in detail the changes that I suggest in the present Standard Methods:

*Change in title*—Standard Methods for the Bacteriological Examination of Oysters.

#### OYSTERS IN THE SHELL

*Collection of Sample*—no change.

*Transportation of Sample*—no change.

*Condition of Sample*—substitute for the whole paragraph the following: "All oysters used for the analysis shall be in apparently good condition. No oyster from which the

shell liquor has escaped, or whose shell is not tightly closed at all times while under observation shall be used for the analysis."

*Technical procedure*—line 9. Substitute the following for the rest of this section beginning "The oysters shall be opened," etc.—"With an oyster knife that has been sterilized by flaming, the shells of five oysters shall be pried open sufficiently so that all the shell liquor is drained aseptically into a sterile wide mouth bottle. Care shall be taken not to puncture the body of the oyster, in order to prevent the dilution of the shell liquor with the sterile body fluids. The composite shell liquor of the five oysters shall be shaken thoroughly and from it shall be prepared dilutions of 1 to 10, and 1 to 100, using sterile sea water or distilled water containing 2 per cent sodium chloride.

Five 1 c.c. portions of the undiluted composite shell liquor, five 1 c.c. portions of the 1 to 10 dilution and five 1 c.c. portions of the 1 to 100 dilution shall be added to fermentation tubes containing standard lactose broth.

The further procedure for the determination of the presence of members of the coli-aerogenes group shall be exactly as specified in *Standard Methods of Water Analysis*, and shall include the presumptive, partially confirmed, and completed tests as required.

*Bacterial Counts*—no change.

#### OYSTERS REMOVED FROM THE SHELL (OPEN OR SHUCKED STOCK)

Omit the last paragraph as published in the *American Journal of Public Health*, July, 1922. This paragraph does not appear in the reprints, also substitute "coli-aerogenes group" for "B. coli" in the third from the last line.

#### EXPRESSION OF RESULTS

Paragraphs 1, 3, and in the tables, substitute "coli-aerogenes group" for "B. coli."

FREDERIC P. GORHAM, *Referee*  
Biological Laboratory  
Brown University,  
Providence, R. I.



## APPARATUS FOR STUDY OF THE BACTERIAL BEHAVIOR OF AIR

W. F. WELLS

*Harvard School of Public Health, Boston, Mass.*

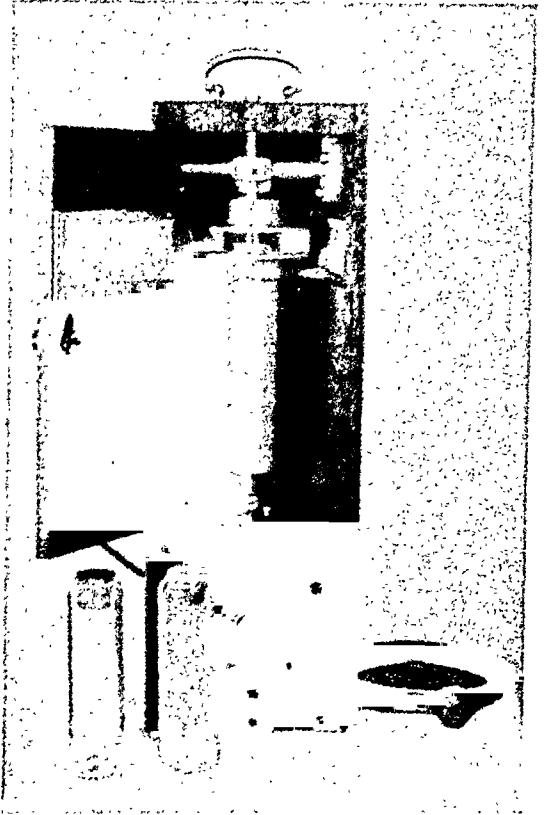
QUANTITATIVE examination of water for non-pathogenic bacteria has become a vital factor in the design, operation, and control of water supply systems, and the sanitary control of streams, bathing places, and shellfish grounds. If air bacteriology in a similar way is to determine in the future the hygienic characteristics of air supply and conditioning systems, it becomes necessary, because of the wide variability of bacterial results, to accumulate more extensive data than are at present available. This necessitates the development of a convenient method by which observers will obtain comparable results.

The author has developed a simple instrument for this purpose, utilizing the principles of the centrifuge in the separation of bacteria and other fine particles from gaseous suspensions such as air. This device operates somewhat in the manner of a milk clarifier which separates heavier particles from a liquid medium. The rapid revolution of a glass cylinder about its vertical axis causes a current of air to enter through a central axial tube, and to escape along a thin layer of nutrient medium supported on the walls of the cylinder. Particles suspended in the air are deposited on the medium. Colonies develop where the individual bacteria have been precipitated and can be counted with the naked eye.

Four independent operations are combined in one compact instrument:

1. Air flow is created.
2. The amount of air is measured.
3. The bacteria are collected.
4. The bacteria grow and can be counted on the collecting medium without separate plating.

The instrument has been subjected to approximately 200 tests, serving three general types of purposes. These are.



to determine the characteristics of (1) atmospheric reservoirs, (2) conditioning equipment, and (3) bacterial sources of aerial contamination.

1. In the study of atmospheric reservoirs, a representative series of tests has been carried on at the laboratory during the past 6 months to determine the effect in one locality of seasonal, diurnal, and meteorological influences.

2. In the study of conditioning equipment, a most interesting observation has been the discovery that certain air blowers remove over 90 per cent of bacteria from air, while others

do not appreciably affect the bacterial content. With the increasing use of fans and centrifugal blowers, this fact may prove of practical importance.

3. In the study of the bacterial sources of aerial contamination, experiments have been made to determine

under what conditions bacteria are given off by persons confined in a limited space. This inquiry leads also to an investigation of the physical, chemical and biological properties of droplets in connection with the theory of droplet infection.

## VITAL STATISTICS

**Increased Tuberculosis Mortality in Young Women in England—** A noteworthy feature of the latest London mortality statistics is the lack of decline in recent years in mortality from pulmonary tuberculosis among young women.

In his annual report for 1927 the Registrar-General of England and Wales pointed out that women of 15 to 35 years of age formed the only section of the population in which an improvement in mortality from phthisis had not been observed in recent years. The cause of this phenomenon has not so far been adequately explained, though it has commonly been attributed to the increase of young women in industrial and commercial employment.

In London, according to the mortality rates set out in this report, the phthisis mortality among women has actually risen, between 1911–1913 and 1929–1931, by 23 per cent at ages 15 to 20, and 30 per cent at ages 20 to 25. In every other age group, and at every age among males, a decline is registered. When these deaths from pulmonary tuberculosis, at ages 15 to 25, are stated as a percentage of the deaths from all causes at the same ages, it is found that London shows the greatest relative increase in phthisis, the rural districts of the whole country showing almost no change between 1911–1913 and 1928–1930. The suggestion is that in the rural areas the occupation of young women has not changed to the

same extent as in urbanized areas. Yet when the London figures are considered in more detail by the comparison of two groups of boroughs—those representing the poorest population and those representing better-class areas—it is found that the increase in the percentage of pulmonary tuberculosis as compared with all deaths among young women of 15 to 25 is much the same in both groups.

If change of employment from domestic work to commercial or industrial occupations or "industrialization" were alone the cause of the increased mortality from phthisis, the change should be far more conspicuous in the better class areas; for in these, the occupation figures of the census years 1911 and 1921 show that, in the 10 years intervening between them, the proportion of young women of this age engaged in domestic service decreased by nearly one-half, while in the poorer group of the population, the number employed in domestic service is comparatively negligible in both censuses.

An analysis of further available data shows that practically the whole of the increase in mortality from pulmonary tuberculosis in London has been among single women. The obvious explanation that young women suffering from phthisis do not marry is insufficient to explain the considerable divergence in mortality between the single and the married women. The possibility cannot be excluded that it is the young unmarried women who are likely to be most adversely affected by economic conditions. As (judging by mortality

rates) their resistance to pulmonary tuberculosis in the early years of adolescence is less than that of young men, it is only to be expected that when adverse economic conditions are added at this period of life, the young women will be much more affected than young men. If this is the explanation of the facts, an improvement in economic conditions affecting young women wage earners should be followed by a decline in this excessive mortality.

A factor which has not been considered in this report, but which may affect London to a peculiar degree, is internal migration. It has been shown that in all probability the relatively low phthisis rates in the urban areas and the relatively high rates in the rural areas among young adults—especially women—are related to the migration of the more physically fit from the country to the town, the town mortality being lowered, and the country mortality increased, by this movement of the healthiest. If, as there is some reason to believe, this selective migration to London has been slackening of recent years, the London mortality rates, especially from phthisis, are likely to be swollen owing to this relative absence of healthier recruits. Though this might be a practical explanation of the abnormal rise shown in the London rates, it obviously fails to be a complete explanation, since, as has been pointed out, the lack of decline in pulmonary tuberculosis in young females extends to the whole country.—*Lancet*, 16:866 (Oct. 15), 1932.

**Aviation Mortality in 1931**—The fourth report of the committee, on aviation of the Actuarial Society of America indicates that improvement has taken place in some aspects of the mortality experience due to flying. A summary of the findings made known by J. E. Hoskins, assistant actuary of the Travelers Life Insurance Company

and chairman of the committee reveals that, in 1931, there was an improvement in mortality in civilian flying other than schedule flying, but no significant change in experience under schedule flying or in military flying.

The passenger death rate in schedule flying is given as 2 deaths per 100,000 passenger hours, or 5 per 100,000 flights. On the basis of the number of passengers carried on schedules and the number of deaths occurring in this type of flying, the experience in 1931 was 1 fatality for every 19,346 passengers carried. In 1930, the death rate was 1 fatality for every 17,396 passengers, while in 1929 it was 1 for every 9,633 passengers, and in 1928, 1 fatality for every 3,314. Stated on the basis of the number of flights, the death rate of passengers was 30 per 100,000 flights in 1928, 10 in 1929, 6 in 1930, and 5 in 1931.

In short sightseeing flights, the mortality rate, per 100,000 passengers, was about 3, and the rate per 100,000 passenger hours about 9. The death rate of passengers in pleasure flying was about 25 or 30 per 100,000 flights. In pleasure flying the death rate per flight seems very high, although it shows some improvement. In that connection it was mentioned in the report that much of the flying is done by inexperienced or unlicensed pilots.

A distribution of passenger fatalities by kind of flying in 1931 revealed 27 deaths under schedule flying for hire and 105 in pleasure flying. Passenger fatalities for the year totalled 183. The mortality rate of commercial pilots ranged between 20 and 25 per 1,000. Indications pointed to a lower rate for amateur pilots. The report states that a very small amount of annual flying by amateur pilots leads to a low rate of mortality per year, although perhaps a high rate of mortality per hour. The mortality among students was said to be relatively low, but the report adds that

after a license is obtained, and particularly after the student qualifies for a transport license, the mortality rate increases sharply for a time, then decreases gradually, but seems to level off with no appreciable improvement after about 1,000 hours in the air. It is indicated that the mortality rate of regular army and naval pilots is higher on an hourly basis than that of scheduled commercial pilots but lower than that of non-scheduled commercial pilots in general.

The mortality experience of licensed pilots shows that in 1929 there were 34 deaths for each 1,000 transport pilots, as against 23 per 1,000 in 1930, and 19 in 1931. It was thought that the improvement might have been due to a temporarily decreased amount of flying. The death rate among limited commercial pilots was 18 per 1,000 in 1929, 20 in 1930, and 9 in 1931. Among private pilots the death rate in 1929 was 12 per 1,000, as against 14 in 1930, and 8 for 1931.

The more experienced class of pilots has consistently exhibited the highest rate of mortality per year, while the less experienced class has in general exhibited the lowest rate. This is explained by the fact that the mortality rate increases with the amount of annual flying time, although not in direct proportion. Among transport pilots the mortality is said to be high for those with less than 500 hours' experience, while the available evidence indicates no material improvement in the annual mortality rate after 1,000 hours' experience has been passed. A relatively high mortality was said to exist among pilots of 2,000 or more hours' experience.

The report indicates that in 1930 there was a passenger death for every 4,300,000 passenger miles flown, as against 1 death for every 440,000,000 railroad passenger miles. In 1931 there was a passenger fatality for every

4,600,000 passenger miles flown.—*Insurance Field*, 61:5, 17 (Oct. 14), 1932.

A Comparative Study of Acute Anterior Poliomyelitis in Philadelphia in 1916 and 1932—This year has witnessed the second extensive outbreak of epidemic poliomyelitis in Philadelphia, the first being in 1916. In the intervening years no definite outbreaks have occurred, although the years 1930 and 1931, inclusive, exhibited an unusual number of cases. In fact, starting with 1929 there has been a steady yearly increase of cases from 45 in 1929, to 106 in 1931. In the 1916 epidemic there were reported 1,006 cases with 307 deaths, giving a case death rate of 32 per cent. To October 1 this year there have been 645 cases and 73 deaths, with a case death rate of a little over 11 per cent, as compared with a 30 per cent case death rate for the corresponding period of 1916. The fractional death rates, however, are hardly comparable, inasmuch as in 1916 the diagnostic criterion was paralysis, whereas in 1932 many cases in the preparalytic stage have been included.

Not only is the fatality rate lower in this year's epidemic, but the type of the disease is less severe, resulting in relatively less permanent paralysis. In both epidemic years 1 case each was reported in the month of June; 37 and 26 in July; 445 and 318 in August; and 365 and 306 in September of 1916 and 1932, respectively. The peaks in both epidemics were reached in the fourth week of August with 133 and 118 cases, respectively. The greatest number of cases reported in a single day was 36 on August 22, 1916, and 21 cases on August 28, 1932, almost a week later.

The parallelism continues fairly true as to location of first appearance and geographical distribution. Both epidemics seem to have originated during the month of July from a focus in

South Philadelphia, comprising the 1st, 2nd, 26th and 39th wards. In 1916 there was a coexisting focus in North Philadelphia in the 43rd ward, and in 1932 a similar accessory focus in Central Philadelphia in the 15th ward. In 1916 the disease expanded from the aforementioned foci to involve South, North, and Northwest Philadelphia, and North and Southwest Philadelphia. The banner ward in South Philadelphia was the 39th with 63 cases; in North Philadelphia the 43rd ward with 63 cases; in Northwest Philadelphia the 22nd with 79 cases, and in West Philadelphia the 40th with 42 cases. So far this year the same trend of expansion has been followed with the exception of an early simultaneous explosion of cases from the 15th ward instead of from the 43rd ward as in 1916.

The similarity of dissemination along certain ward boundaries that are highly congested may be explained as offering the maximum opportunity for contact infection. This year's wave has been a little later in getting started, it has not approached the 1916 incidence, and from present indications has already spent its force. Inasmuch as both outbreaks reached their peaks about the same time it may be deduced that their declines will relatively parallel, and that return to normalcy may be expected by December of this year. At this time the outbreak is actively receding, there having been but 45 cases reported for the week ending October 1, 1932, and the daily cases since then have been averaging 4 per day. — *Monthly Bull.*, Philadelphia Dept. of Health, Nov., 1932, p. 3-4.

A Tuberculosis Survey of the Territory of Hawaii, 1931—Tuberculosis, causing some 400 deaths every year in Hawaii, and approximately 200 deaths a year in Honolulu, is generally recognized as being one of the gravest of health problems in the Territory.

In 1931, the death rate from this disease, per 100,000 population, was 106 for the Territory and 148 for Honolulu, compared with a rate of 75 in 1929 for the death registration area of the United States.

The average death rate from tuberculosis, by 5-year intervals, shows that there was a decline for the Territory of 9 per cent from 1900 to 1919 and a 31 per cent decline during the next 10 years. For Honolulu, the decline was more uniform. While the tuberculosis death rate has declined 62 per cent in the registration area of the United States during the past 30 years, the decline during the same period in Hawaii has been approximately 40 per cent, while for Honolulu a 78 per cent reduction has been noted.

When the tuberculosis mortality rate for Honolulu is corrected for residence, it is approximately 127 rather than 148 for 1931. It is obvious, however, that even after correction for residence, Honolulu's tuberculosis mortality rate is higher than that for most cities with populations of comparable size.

Hawaii's death rate from tuberculosis (106) is greater than that for any state on the mainland with the exception of Arizona (275.9), New Mexico (158.8\*), Colorado (117.5\*) and Tennessee (108.7). It should be noted that these four states are either health resort states or southern states. In the latter, a high negro death rate affects the figures.

The greatest number of deaths from tuberculosis occur among people in early adult life, the maximum number of deaths occurring in the age group from 20 to 39 years. It is the leading cause of death among persons from 10 to 50 years of age. Thirty-seven per cent of all deaths from tuberculosis are concentrated in the age group between 15 and 35 years, a group which contains

---

\* 1930 death rate.

38 per cent of the population of the Territory. In the later age groups, although the actual number of deaths is small, the death rate from tuberculosis continues its upward trend to the oldest age groups, due to the relatively smaller number of persons living at those ages. This curve of tuberculosis mortality rate by age in the Territory shows a more marked rise in the older age groups than that for the registration area of the United States.—*A Tuberculosis Survey of the Territory of Hawaii and City and County of Honolulu*, 1931, pp. 15-19.

**Hospitalization of Mental Patients**  
—Results of enumerations of patients in state hospitals for mental disease for 1929 and 1930 were recently announced by the U. S. Bureau of the Census. The total number of patients on the books of the 164 state hospitals and 2 federal hospitals (St. Elizabeths Hospital, Washington, D. C., and Asylum for Insane Indians, Canton, S. D.) at the end of 1930 was 323,688. This number represents 236.1 persons per 100,000 of the general population.

It was said that the hospitals during 1930 cared for a daily average of 31,422

patients above their normal capacity. During 1930 the hospitals admitted 62,738 patients for the first time and 15,714 who had previously been treated in hospitals for mental disease. Men outnumbered women among first admissions, 144.8 to 100. Dementia praecox was the diagnosis in more than 20 per cent of the new admissions, 13,047 cases in 1930 and 12,187 during 1929.

Among readmissions manic-depressive psychosis was the most frequent cause, a situation attributed to the recurrent nature of the disease. There were nearly as many readmissions for this disease as new admissions; the latter amounted to 14 per cent of all new admissions.

In 1930, 38,538 patients were discharged; 29.6 per cent as recovered; 45.6 per cent, improved, and 10.9 per cent, unimproved. There were 26,923 deaths of mental patients in state hospitals in 1930, a mortality rate of 89.7 per 1,000 patients under treatment. The cost of operation for 160 hospitals in 1930 was \$105,733,982, a per capita cost of \$302.64. The personnel included 45,817 officers and employees.—*J.A.M.A.* 99:1363 (Oct. 15), 1932.

## PUBLIC HEALTH ENGINEERING

### PUBLIC HEALTH ENGINEERING MANUAL\*

THE Committee on Public Health Engineering Manual was appointed to collaborate with similar committees of other sections in the activities of the Sub-committee on Manual of Administration of the Association's Committee on Administrative Practice. Lack of funds with which to function apparently

has temporarily checked activities of Manual of Administration Sub-committee and for this reason your chairman has not formally organized the section committee and made arrangements for work assignments. He has, however, conferred with several members of the section with reference to the advisability of preparing a public health engineering manual to serve as a guide to administrative public health officials,

\* Report of the Committee, presented to the Public Health Engineering Section at the Sixty-first Annual Meeting at Washington, D. C., October 25, 1932.

particularly in organizing public health engineering divisions, establishing sound policies of operation and proper allocation of funds for engineering activities. He has found enthusiastic endorsement of the project in every case.

It is believed that the section could best serve the public health engineers by preparing a complete manual entirely separate from the public health manual contemplated by the Committee on Administrative Practice. As our section contribution to a general manual, a digest of the public health engineering manual could be prepared; the one committee representing the section in both functions.

The preparation of a public health engineering manual is a sizeable undertaking and it might require from 3 to 5 years for completion. In order to be the most help to the Manual of Administration Sub-committee, it is believed that the first year's effort should deal with the administrative policies, organization, and budget requirements of an engineering division in each of the principal units of public health administration; the federal, state, county, and municipal departments of health. Material of this nature is what is most needed for a public health manual and at the same time it would serve engineers in obtaining proper recognition of their work and policies and in support of their budget requirements.

In later years special monographs on such individual public health activities as supervision and control of water supplies, sewage disposal, swimming

pools, dairy sanitation, insect and rodent eradication, garbage and refuse disposal, environmental sanitation, smoke and other air pollution, industrial sanitation, heating and ventilation, plumbing, housing, noise control, lighting, city planning, disaster relief, and waterways pollution, could be prepared in collaboration with other section committees, the completed work to make up a public health engineering manual of real value to all engaged in public health work and more particularly to the engineers.

Ways and means of financing a complete manual are not yet apparent. It is believed that this is a matter to be left for later consideration when the material is ready. Difficulty is not anticipated in getting mimeographed copies made of the work recommended for next year's activities in collaboration with the Sub-committee on Manual of Administration. Special consideration should be made in appointing the Public Health Engineering Manual Committee of the section to see that its membership includes those engaged in federal, state, county, and municipal public health engineering work. Therefore, it is recommended that the committee be continued with instructions to proceed with the preparation of a manual as suggested above.

A. E. GORMAN, *Chairman*  
F. A. BARBOUR  
N. S. HILL  
G. A. SOPER  
E. W. STEEL  
M. C. WHIPPLE

## SEWAGE DISPOSAL \*

THE Committee on Sewage Disposal regrets that it is unable to present

\* Progress report of the Committee on Sewage Disposal, presented to the Public Health Engineering Section at the Sixty-first Annual Meeting at Washington, D. C., October 27, 1932.

a report at this meeting of the American Public Health Association. The subject chosen was "The Uses of Chlorine in Sewage Disposal." A large amount of preliminary work has been

done, including the preparation of a very comprehensive bibliography and its arrangement by subjects, together with a study of the historical development. Owing to the demands on the time of various members of the committee, it has proved impossible to cover the ground and formulate a report at this time. The committee, therefore, requests that it be extended for another year, so that the material gathered can be properly studied and compiled, with a view to presenting a finished report

at the meeting of the Public Health Engineering Section in 1933.

LANGDON PEARSE, *Chairman*  
 C. K. CALVERT, *Secretary*  
 A. M. BUSWELL  
 V. M. EHLERS  
 H. P. EDDY  
 C. E. KEEFER  
 F. W. MOHLMAN  
 WILLEM RUDOLFS  
 F. M. VEATCH  
 P. J. A. ZELLER

## FELLOWSHIP AND MEMBERSHIP \*

THE Committee on Fellowship and Membership, the purpose of which is to add to the Section membership from among the eligible engineers who are not affiliated with the American Public Health Association, was set up on a geographical basis as given below:

M. M. Cohn	New York, New Jersey, Pennsylvania
G. H. Ferguson	Canada
P. G. Galan	Mexico and Central America
A. E. Gorman	Michigan, Wisconsin, Min- nesota, Illinois
C. E. Green	Oregon, Washington, Idaho, Montana, Wyoming
A. P. Miller	Delaware, Maryland, Vir- ginia, West Virginia, North Carolina, South Carolina, Georgia, Florida
C. L. Pool	Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine
L. B. Reynolds	California, Nevada, Utah, Arizona
E. W. Steel	Texas, Oklahoma, New Mexico, Colorado
E. C. Sullivan	Louisiana, Alabama, Missis- sippi, Arkansas, Missouri, Tennessee
M. W. Tatlock	Ohio, Indiana, Kentucky
E. L. Waterman	Iowa, Nebraska, North Dakota, South Dakota, Kansas

A letter notifying each committee member of his appointment and territorial assignments was mailed on February 24.

The names of the 777 engineering prospects used for promotion purposes were selected from the membership lists of the American Water Works Association, New England Water Works Association, the Chlorine Institute, and other smaller miscellaneous groups.

A letter signed by the chairman was mailed to the entire list of prospects on May 19. This letter offered membership and a subscription to the *American Journal of Public Health* for \$5.00, with the option of obtaining a copy of the \$3.00 *Year Book* of the American Public Health Association for an extra dollar. Several other books of interest to engineers were also included in this offer.

Immediately after the May 19 letter was mailed, a list of prospects in the various territories was sent to each committee member, together with a copy of the letter of invitation. The committee members were urged, with the clerical assistance of the Executive Office of the American Public Health Association, to follow up their prospects. Also, on June 7 a copy of the follow-up letter sent out by L. B.

\* Report of the Committee, presented to the Public Health Engineering Section at the Sixty-first Annual Meeting at Washington, D. C., October 25, 1932.



Reynolds was forwarded to each member as a suggested form to use. At this time also the committee members were advised of any responses from prospects in their territories to the first letter of invitation.

It is definitely known that 8 of the committee members sent follow-up letters, 7 of which were prepared in the American Public Health Association office and mailed to the committeemen for signing.

On September 27 a second letter was mailed to 425 of the prospects in the states around Washington, D. C. This letter stressed the sessions of the Section at the Annual Meeting, and indicated that members of the American Public Health Association were entitled to reduced railroad fare to Washington. There was also mailed with this letter a copy of the advertisement used in engineering magazines and the list of papers to be discussed at the meeting.

As a result of these efforts, 21 applications were received up to October 20,

all but a few of which were accompanied by membership dues. In addition, there were responses from 30 other individuals, 20 of whom indicated interest in membership but advised that they could not join at the present time due to the economic situation.

Your committee feels that further efforts with this group next year will bring in more new members, and presents this report with thanks for this opportunity to further the interests of the Public Health Engineering Section.

L. H. ENSLOW, *Chairman*

M. M. COHN

P. G. GALAN

G. H. FERGUSON

A. E. GORMAN

C. E. GREEN

A. P. MILLER

C. L. POOL

L. B. REYNOLDS

E. W. STEEL

E. C. SULLIVAN

M. W. TATLOCK

E. L. WATERMAN

## INDUSTRIAL HYGIENE

**Chronic Poisoning by Oxalic Acid: With Report of a Case and Results of a Study Concerning the Volatilization of Oxalic Acid from Aqueous Solution**—This is a brief report of a case of chronic poisoning by oxalic acid. The victim, a man aged 53, was employed to clean automobile radiators, using a solution of oxalic acid. The solution was made by adding the crystals directly to the radiator and the concentration was apparently from 10 to 20 per cent. After approximately 1 year's work the man became completely disabled. The symptoms appeared to be nosebleed, headaches, vomiting, pain in the back, loss of weight, cough, generalized weakness, and nervous irritability. Reflexes were

apparently normal; there was no swelling of the muscles and joints, and no tenderness on manipulation.

References to the literature would indicate that the toxic action of oxalic acid is brought about by its combination with calcium and the removal of the calcium from its availability to the body as a whole.—Charles D. Howard, *J. Indust. Hyg.*, XIV, 8:283-290 (Oct.), 1932. L. G.

**Asphyxia From an Unexpected Cause**—In this contribution a peculiar series of events are described in which deoxygenated air high in carbon dioxide found its way through a river bed to the working chamber of a caisson, leading to the death of 5 men engaged in

the chamber. The air had become deoxygenated by passage through the highly organic river bottom and was found to contain approximately 14 per cent carbon dioxide and 0.12 per cent oxygen.—E. L. Middleton, *J. Indust. Hyg.*, XIV, 8:291-294 (Oct.), 1932.

L. G.

**Carbon Monoxide Survey in Liberty Tubes, Pittsburgh**—This is a report of a study of concentrations of carbon monoxide in the twin Liberty tubes at Pittsburgh. These tubes are approximately 5,900 ft. long and have a cross-sectional area of 468 sq. ft. each. Ventilation is accomplished by 8 Sirocco-type fans located in a fan house directly over the tunnel near its midpoint.

The carbon monoxide concentration determinations were made by the continuous carbon monoxide recorder developed by the U. S. Bureau of Mines. The study disclosed the fact that during the time of the peak load, brief traffic stops were occasioned by minor accidents and indiscretions of motorists, and that the concentrations of carbon monoxide during these periods often exceeded a desirable maximum.

The study recommends that the minimum speed of traffic should be 25 miles per hour and that pedestrians should be prohibited from using the tunnel during the time of such peak loads. There are ten other recommendations of lesser importance to which the reader is referred.—C. B. Maits, *J. Indust. Hyg.*, XIV, 8:295-300 (Oct.), 1932.

L. G.

**Modified Form of the Greenburg-Smith Impinger for Field Use, with a Study of Its Operating Characteristics**—A modified form of the Greenburg-Smith Impinger apparatus is described. This instrument employs 75 c.c. of water or other sampling fluid, and is so designed that it operates with

a constant sampling rate of air pressure ranging from 30 to 75 lb. without any regulation.—T. Hatch, H. Warren, and P. Drinker, *J. Indust. Hyg.*, XIV, 8:301-310 (Oct.), 1932.

L. G.

**The Quantitative Determination of Fine Soot Inhaled by Man**—This is a description of a very simple apparatus consisting of a short bent piece of metal tubing approximately 10 to 12 cm. in length and 1.6 cm. diameter, threaded at one end to which a nut is attached. By means of this nut and a sleeve clamp a piece of filter paper is fastened so as to cover one end of the tube. Air is aspirated through the tube at a rate of approximately that of a breathing man.

After a suitable sampling period the filter is removed and compared with a set of color standards. These standards are prepared by suspending soot in chloroform so that the suspension contains 1 mg. of soot per c.c. of chloroform. By using smaller or larger volumes of the suspension, standards of known density are prepared which then serve as a basis of comparison for unknown samples taken at the workplace being studied.—A. I. Burstein, *J. Indust. Hyg.*, XIV, 9:339-344 (Nov.), 1932.

L. G.

**The Problem of the Possible Health Hazard of Lead-Weighted Silk Fabric**—The increasing use of silk fabrics weighted with lead has suggested this problem to the authors, the purpose of this study being to determine the possibility of lead poisoning from silk weighted with lead salts.

The actual experiments took the form of determining under what conditions body fluids would affect the lead salts in silk fabrics and whether absorption of lead occurs in individuals wearing such material. The experiments were carried out by placing 6" squares of the silk in flasks containing

measured amounts of liquid. The flask was then rotated in an electrically heated water bath for periods of over 3 hours duration at body temperature.

On removal from the bath, measured portions of the suspension were used for analysis. In neutral solutions it was found that the amount of suspended lead was extremely small and that the amount of dissolved lead was either zero or the barest trace, so that micro-chemical methods yielded very minute amounts. Urine, saliva, perspiration, physiological saline, tap water, and distilled water were tested at normal physiological pH's. Only in the case of saliva, tap water and distilled water micro-chemical methods yielded a positive test.

Studies of urine and feces of subjects wearing lead weighted silk garments indicated that no absorption of lead occurs even under extreme conditions, as a result of direct contact of such garments with the skin.—L. T. Fairhall and J. W. Heim, *J. Indust. Hyg.*, XIV, 9:317–327 (Nov.), 1932. L. G.

**The Determination of a Single Index of Atmospheric Conditions in Relation to Physiologic Effects—**The authors' succinct summary follows:

The physiologic responses of two subjects to moderate effective temperatures were ascertained for 3-hour periods. Tests were made at a wet bulb temperature of from 70° to 85° in moist air (96 per cent saturated) and dry air (40 per cent saturated). The pulse rate observed in the winter experiments agree well with the effective temperature scale, but not that observed in the summer experiments. Owing to acclimatization, the summer pulse was from 2 to 8 beats slower than in winter, the pulse in dry air being only 5 beats greater than in moist air of the same wet bulb temperature, as contrasted with the winter difference of 11 beats.

The rise of body temperature varied in accordance with the effective temperature in winter, but not in summer. The skin temperature of the face varied approximately with the effective temperature, but that of

the trunk showed no sort of correspondence. The loss of moisture by perspiration varied closely with the scale.

One of the subjects performed heavy mechanical work, and his efficiency fell off slightly with rise of temperature. The fatigue experienced varied in accordance with the effective temperature.

It is pointed out that we may be able to obtain a single index to represent the physiologic response of the body to the combined effects of dry bulb temperature, wet bulb temperature, air movement and radiation; but acclimatization must always be taken into account.—

H. M. Vernon, *J. Indust. Hyg.*, XIV, 9:328–338 (Nov.), 1932. L. G.

**Studies of School Ventilation—**A single monograph includes Contributions Nos. 2 to 6, inclusive, of the reprints of the New York Commission on Ventilation whose work was financed by the Milbank Memorial Fund. All of the articles appeared in the various issues of the *American Journal of Hygiene* between July, 1930, and January, 1932. Their titles follow: (1) A Study of Ventilation and Respiratory Illness in Syracuse Schools; with an Analysis of Factors Affecting Criteria Used; (2) A Study of Ventilation and Respiratory Illness in Syracuse Schools; Rate of Air Flow and Room Temperature in Relation to the Health of School Children; (3) A Study of Ventilation and Respiratory Illness in New York Schools; Comparison of Window-Gravity Ventilation and of Unit Fan Ventilation with Varying Air Flow; (4) A Study of Rural School Ventilation in Cattaraugus County, New York; (5) Vasomotor Reactions to Localized Drafts. E. R. H.

**Six Years of Tannic Acid Treatment of Burns—**Davison announced his early observations on the tannic acid treatment of burns in 1925. An extensive literature has already appeared on the subject. The present author reports

on 310 consecutive cases at St. Luke's and City Hospitals, Cleveland.

From the work of others it appears that by this method the mortality of burns has been reduced from one-half to one-third, although during the first 24 hours the mortality rate is much the same regardless of the type of treatment used. The tannic acid method prevents subsequent complications to a large extent. In the 310 cases the mortality was 9.6 per cent. In 120 cases treated by various methods prior to 1926, the mortality was 14 per cent.

The exact technic and management of cases is described. Stronger tannic acid solutions (5-10 per cent) are recommended than have been the custom heretofore.—Donald M. Glover, *Surg., Gynec., Obst.*, 54:798-805 (May), 1932.  
E. R. H.

#### Shorter Work Periods in Industry

—Unquestionably the spreading or sharing of work is a most effective emergency measure during a business depression. Whether or not such a policy is necessary or desirable over a longer period is one on which opinions differ.

Statistics show that while improved agencies of production decreased the demand for industrial labor as much as 24 per cent between 1914 and 1925, the demand for manufactured commodities not only re-absorbed these but required an additional  $1\frac{1}{2}$  million workers.

Before any permanent change in hours is decided upon the possibilities in the following should be considered: Research, with its potentialities for creating new demands; infant industries that have not yet fulfilled their present demands; the amount of normal business activity necessary to replace old

and obsolete equipment; the rate of pay per hour—if no increase then purchasing power will presumably decline, but if an increase then cost and prices will tend to increase; the fact that substituting a 6-hour for an 8-hour day has, by experience, increased labor demand only from 5 to 25 per cent, and not  $33\frac{1}{3}$  per cent as theoretically possible; any redistribution of work and pay roll will mean a sharing of both employment and unemployment, resulting in greatly increased underemployment; the proper use of increased leisure; the reduction in the use of expensive capital equipment; the difficulties attendant upon adopting a policy of shorter work periods almost simultaneously in order to prevent handicap, etc. Experience rather than preconceived opinion is first needed.—National Industrial Conference Board, Nov., 1911. E. R. H.

**A Microscopic Study of the Tissues of the Albino Rat Following the Ingestion of Aluminum Salts—**The conclusions reached in this study are based upon the findings in 80 test and 22 control animals which had received varying amounts of aluminum salts up to 3.6 per cent of feed by weight.

The protracted ingestion of aluminum salts in concentrations as high as 3.6 per cent has no deleterious effect upon the growth, reproduction, or blood picture of the white rat.

Livers of the animals examined contained a normal amount of iron.

There was no evidence of gross or microscopic pathology in the organs examined which could be attributed to the ingestion of aluminum salts.—Ernest Scott and Mary K. Helz, *Am. J. Hyg.*, 16, 3:865-870 (Nov.), 1932.

E. R. H.

## FOOD AND NUTRITION

**The Vitamin A, B, C and G Content of Concord Grapes**—There has been previously reported work on the vitamin content of Thompson Seedless and Malaga grapes (*A.J.P.H.* 22:548, May, 1932). The Concord grapes tested in this experiment were representative of the fruit available to the consumer. The pulp and juice were fed in 2, 4, and 6 gm. daily amounts for vitamin A, B, and G content, and in 10, 12, and 15 gm. amounts for vitamin C. Eight rats were used for the vitamin A, B and G, and 7 guinea pigs for vitamin C.

It was found that 6 gm. of the edible portion of Concord grapes fed as the sole source of vitamin A induced but little growth in the rats during the 8-week test period. Very small amounts of vitamin B were found. Histological examination of the teeth of the guinea pigs showed no evidence of protection when 10, 12, and 15 gm. of Concord grapes were fed daily. No vitamin G was found.

Malaga and Thompson Seedless grapes were found to be fair sources of vitamin A, B, and C while a small amount of vitamin G was found. These differences may be due to a greater concentration of vitamin in the skins, which were retained in the former experiment and were discarded in the experiment on Concord grapes.—Esther Peterson Daniel and Hazel E. Munsell, *J. Agri. Res.* 45:445 (Oct. 1), 1932.

**The Importance of Temperature on the Survival Time of Bacteria in Acid Foods**—It is well established that rise in temperature results in increased bactericidal efficiency of the hydrogen ion. Studies were undertaken to determine the effects of low temperature stor-

age of acid foods on the survival of pathogenic bacteria commonly associated with food poisoning. Typhoid strains were also included in these experiments.

The data obtained indicate an appreciable inhibition of the bactericidal effect of the hydrogen ion by such temperatures as  $-4^{\circ}$  C. and  $-12^{\circ}$  C. At such low temperatures organisms of the intestinal group may survive over a period of 7 days. This suggests the possibility of infection by this group of organisms in highly acid foods preserved only by storage at such temperatures. Danger is possibly decreased by the fact that massive infection of the product would be relatively rare. It follows, therefore, that preparation and handling of such foods should be subject to as rigid regulations and inspection as are applied to non-acid types of food.

It is concluded that decrease in temperature allows the survival of organisms of the intestinal group over dangerous periods of time at hydrogen ion concentrations rapidly lethal at ordinary temperatures.—Paul J. Beard and J. P. Cleary, *J. Prev. Med.*, 6:141 (Mar.), 1932.

**The Vitamin B and G Content of Raw and Cooked Broccoli**—In this experiment, only the edible portion of the plant was used. In determining vitamin B, albino rats, 28 days old, were fed a basal diet consisting of 58 per cent cornstarch, 18 per cent vitamin B-free casein, 10 per cent autoclaved yeast, 8 per cent filtered butterfat, 2 per cent cod liver oil, and 4 per cent Osborne and Mendel salt mixture. After 2 weeks on this diet each animal was then fed daily, 6 times a week, raw broccoli in the amount of 1, 2, 3, and 4 gm. and

equivalent amounts of the cooked vegetable.

Three gm. of the raw material contained 1 unit of vitamin B and induced a total gain in weight of 25 gm. during the test period. Four gm. of cooked broccoli contained no more vitamin B than 2 gm. of the raw material.

In determining vitamin G, the basal diet of Sherman and Spohn (*J. Am. Chem. Soc.* 45:2719, 1923) was modified by incorporating into it alcoholic extract of rice polish. One and two gm. portions of raw and cooked broccoli were fed. Raw broccoli contains a measurable quantity of vitamin G. Rats fed 2 gm. of cooked broccoli gained at a somewhat lesser rate, indicating slight destruction of this vitamin during cooking.—Hazel E. Munsell and Hilda Black Kifer, *J. Home Econ.* 24:823 (Sept.), 1932.

**Vitamin C in Canned Citrus Products**—In this experiment young guinea pigs weighing approximately 300 gm. were used, the dose being apportioned according to weight. The test was run for 90 days and autopsies performed to determine the Sherman scurvy-score. The oranges and grapefruit were tree-ripened, prepared promptly for canning, heat-exhausted, sealed in plain tin cans, and subjected to a short heat treatment. When the experiments were conducted the citrus products were from 7 to 10 months old.

One gm. per day (6 days a week) of canned orange juice fully protected against scurvy in a 90-day test period. Canned orange slices, canned grapefruit slices and canned grapefruit juice were slightly less effective than canned orange juice, slightly more than 1 gm. daily affording protection against scurvy. Commercially canned orange juice, orange slices, grapefruit juice and

grapefruit slices, after 9 months' storage, contained fully as much vitamin C as fresh citrus fruits.—Carl F. Fellers and Paul D. Isham, *J. Home Econ.* 24:827 (Sept.), 1932.

**Rickets in Rats. XIII. The Effect of Various Levels and Ratios of Calcium to Phosphorus in the Diet Upon the Production of Rickets**—This is a study of the relative as well as absolute amounts of calcium and phosphorus in the diet in connection with production of rickets. Varying amounts of  $\text{CaCO}_3$  and  $\text{Na}_2\text{HPO}_4$  were given to 24 day old rats. After 21 days on the diet they were X-rayed, killed by bleeding, and blood serum analyzed for calcium and phosphorus.

The bones were examined histologically and the ash content determined. The calcium and phosphorus ratios were 1:1, 2:1, 3:1, 4:1, 6:1, and 8:1. In each ratio there was a variation in the level of both calcium and phosphorus from low to actually high amounts.

The results of this experiment show that for the same ratio a diet becomes less rachitogenic as the total salt level is raised; also that within the range the rickets are more severe the greater the ratio at a given level of phosphorus. The blood serum phosphate decreases with increasing ratio at each level of calcium, and the phosphate of the serum increases with the salt present. For a given level of calcium an increase in the ratio of calcium to phosphorus results in a decrease in bone ash. At a given ratio of calcium to phosphorus, increasing the salt level increases the ash in bones.—Helen Bennett Brown, Alfred T. Shohl, Edna E. Chapman, Catharine S. Rose and Esther M. Saurwein, *J. Biol. Chem.* 98:207 (Oct.), 1932.

# CHILD HYGIENE

## CHILD LABOR AND CHILD HEALTH

CHILD labor is serious at any time; but during the present crisis it is especially alarming, as it not only tends to disturb further the economic balance, but adds to the hardships and ill health of many children. It is important, therefore, to have clearly before us the picture which child labor presents today. Its newer aspects look upon health protection, vocational education, recreation, accident prevention, workmen's compensation, and proposals for health insurance.

Child labor has been defined recently by the National Child Labor Committee as "the work of children under conditions that interfere with their physical development, education, and opportunities for recreation. It is the employment of children at unfit ages, for unreasonable hours, under unhealthful or hazardous conditions, or while school is in session."

The White House Conference on Child Health and Protection devoted considerable time to the consideration of this subject. The report of the Committee on Vocational Guidance and Child Labor is replete with valuable information and recommendations.

"The task of the Child Labor Section of this Committee has been to set up certain standards for the health and protection of working children. It has reaffirmed the conviction expressed in the earliest child labor legislation that education and freedom from premature toil go hand in hand and must advance together, and it has given evidence to show that labor in immaturity thwarts normal physical development. It has agreed that children under 16 should not be permitted to leave school for

work, and boys and girls of 16 and 17 in industrial employment should not be suffered to enter occupations known to be physically or morally hazardous, to work more than 8 hours a day or 44 hours a week, or to work at night, and minors should be given special protection from hazardous and injurious employments. In the light of present knowledge of the mental and physical needs of the child and the adolescent these standards represent a minimum. They should be looked upon as merely a point of departure for higher goals which the constantly growing contributions of scientific research will reveal."\*

The 1930 United States Census states that over 2 million children between 10 and 17 years of age were gainfully employed at that time. The National Child Labor Committee feels that this figure is an understatement of the actual child employment as "it does not include children under 10 years, a considerable number of whom are engaged in street trades, tenement home work, and agriculture. Nor does it include the many thousands of children engaged in beet cultivation and other forms of industrialized agriculture whose work does not begin until after April 1, the date on which the Census was taken."†

The abstract of the report on child labor submitted to the White House Conference states that "children are employed by the hundreds and thousands in a great variety of non-agricultural occupations, chiefly in factories, but also in stores, offices, laundries, res-

\* *Child Labor*, Report of Committee on Vocational Guidance and Child Labor of the White House Conference on Child Health and Protection, 1932, p. 10.

† *Child Labor Facts*, published by National Child Labor Committee in 1932.

taurants, as laborers and semi-skilled operatives in many kinds of manufacturing industries, as salesboys and girls, delivery boys, shipping clerks, bundle messenger and errand and office boys and girls, newsboys, garage workers, filling station attendants, porters, railroad laborers, telegraph messengers, telephone operators, servants of all kinds, bootblacks, and barbers' helpers, and almost every other conceivable type of employment. Almost all of these occupations are unskilled, mechanical, and monotonous, offering the child little opportunity to acquire either experience or skill to increase his value as an adult worker."

The relationship between child labor and the strain and hazards of industry has been recognized for some time. In 1926 the United States Children's Bureau published a report on *Physical Standards for Working Children* in which the following statement appeared:

"The minimum age for the entrance of children into industry should be not younger than 16 years. Since it is recognized that the physiological and psychological readjustments incident to pubescence (which in the vast majority of cases are not completed until the 16th year) determine a period of general instability which makes great and special demands upon the vitality of the child, it is of paramount importance that he should be protected during this period from the physical and nervous strain which entrance into industry inevitably entails. The committee recognizes the fact that pubescence may occur early or may be very greatly delayed, and is convinced that the longer it is delayed the stronger is the indication of a physical stage during which it is highly inappropriate to subject the child to the strains of industry."

The White House Conference report states that "Thousands of accidents to young workers are reported annually, many of which result in permanent loss

or loss of use of a member, in serious and permanent disfigurement, or in death. The high accident rate among young workers of 16 and 17 years of age deserves special attention. . . .

"The greater susceptibility, also, of young persons to tuberculosis is now being widely stressed, as well as the close relation existing between tuberculosis and sedentary, confining occupations, and tuberculosis and fatigue. No study of morbidity and mortality among young workers as they are related to employment has been made in recent years. The United States Bureau of Labor Statistics in a study of causes of death among cotton mill operatives, made in 1908, found that the death rate from tuberculosis among boys 15 to 19 years of age employed in cotton mills was nearly double that of boys not employed in the mills, and among girls was more than double. The installation of humidifying systems and of devices to remove lint from the air probably has resulted in an improvement in the conditions under which cotton mill operatives now work as compared with those of twenty years ago. But there is ample evidence that workers in various industries are still employed not only in places in which excessive heat or cold combined with dampness, dusty and lint-laden air, or poisonous fumes, create hazards, but in places where even ordinary standards of ventilation and sanitation are neglected."

Expert opinion of medical and health authorities is not lacking on the deleterious effects of child labor upon health and well-being. In *The Doctor Looks at Child Labor*,\* Dr. Haven Emerson states that "even the school child, protected by interested and competent health supervision, suffers more severely from fatigue than from any other factor during the years of growth and development. Children in industry, whether

\* Published by National Child Labor Committee in 1929.



indoors or out, show in exaggerated form damage to growth and development resulting from the still more aggravated fatigues of child labor. Competition either in agriculture or in factory production depends upon endurance and skill which only adult workers can provide without sacrifice of health."

In the same publication Dr. C. Floyd Haviland states: "Childhood is the period during which types of adult personality are determined. It is, therefore, of the greatest social importance to render conditions favorable during the early years of life for building evenly developed, well-balanced and thoroughly integrated types of personality. Child labor tends to warp, distort and inhibit personality growth, and thus too often it results in the development of malformed child personalities which are the forerunners of ill-balanced, partially integrated and poorly adjusted adult personalities. Individuals handicapped with such personalities contribute in undue measure to all the social problems with which society is confronted owing to their inability to meet adequately the demands of a complex social organization. Before the age of adolescence a child has a full-time job in learning how to live and to adjust to a world which presents many bewildering problems. A child's problems are no less real because they may not exist for the adult; and on the degree of success secured in dealing with them depends in large measure the degree of success which in later years is secured in dealing with adult problems. Child labor subjects a child to an unyielding discipline which takes no heed of special abilities and disabilities. It fails to provide the emotional satisfactions necessary to normal development. A child who is emotionally starved through child labor is one who as an adult is often found seeking denied but normal satisfactions through illegitimate means. A society which permits child labor is one

which thus feeds the future ranks of asocial and anti-social individuals."

It is therefore the direct concern of all those interested in child health to work for minimum standards of protection of children in employment. These have been very well formulated by the National Child Labor Committee.

"The National Child Labor Committee\* adopts the following standards which it considers the minimum necessary to protect children against premature or otherwise injurious employment, and at the same time leave them free for adequate education, physical development and preparation for occupational life. These standards do not apply to domestic or farm work done outside of school hours in or about the home of the child's parents; abuses connected with such work are part of the problem of domestic relations and should be dealt with through parental education, compulsory attendance laws, and, where necessary, through the courts which handle matters of domestic relations or juvenile protection.

#### IN NON-AGRICULTURAL OCCUPATIONS

*"Minimum Age*—No child under 16 years should be employed except that children 14 to 16 years may work outside of school hours in light occupations. School attendance should be compulsory for the entire term for a child under 16 years unless he has completed the course of study available, and the school term should not be less than 9 months.

*"Hours of Work*—No person under 18 years should be employed for more than 6 days or 44 hours a week, or for more than 8 hours in a single day; and for children between 14 and 16 years the combined hours for school attendance and employment should not exceed 8 hours in a single day.

*"Night Work*—No person under 18 years should be employed at night dur-

\* *Where Work Begins*, published by National Child Labor Committee in 1932.

ing the hours between 7 p.m. and 6 a.m., except that boys 16 to 18 years may work until 10 p.m. in suitable occupations.

*"Work Permits"*—No person under 18 years should be employed without a work permit based upon proof of age, employer's promise of work and a certificate of physical fitness with provision for subsequent physical examinations.

*"Dangerous Occupations"*—No person under 18 years should be employed in dangerous or injurious occupations.

*"Workmen's Compensation"*—Adult earning capacity should be considered as the basis on which wages are computed under the workmen's compensation laws for a minor permanently disabled; at least double compensation should be assessed against the employer of a minor who is injured while illegally employed.

#### IN AGRICULTURE

*"School Attendance"*—No child should be employed during the hours

when compulsory attendance laws require his attendance at school. School attendance should be compulsory for the entire term for a child under 16 years unless he has completed the course of study available, and the school term should not be less than 9 months.

*"Minimum Age"*—No child under 14 years should be employed at any time away from the home farm, except that children 12 years and over may engage with their parents in light tasks for a few hours a day during a short season.

*"Hours of Work"*—No child under 16 years should be employed away from the home farm for more than 8 hours in a single day; the combined hours for school attendance and such employment should not exceed 8 hours in a single day.

*"Dangerous Work"*—No person under 18 years should be employed in dangerous or injurious agricultural work; and minors employed in agriculture should be included in the workmen's compensation laws."

# PUBLIC HEALTH NURSING\*

Expenditures for Public Health Nursing Services in Minnesota—An analysis of expenditures of public health nursing services in Minnesota for the year ending July 1, 1932, made by the Minnesota Department of Health shows that 32 county nurses averaged \$145.50 monthly, or \$1,697.50 yearly, for salaries; their average yearly transportation cost was \$503.79, average cost of supplies \$155.03, with average total cost for the service \$2,458.67.

Sixty-three school nurses had an average monthly salary of \$167.31 and a yearly salary of \$1,505.85; their average yearly transportation expenditure was \$103.59 and supplies \$75.14; total cost of each service \$1,652.01.

Twelve community nurses received an average of \$140.85 monthly, \$1,690.25 yearly. Their transportation expenses averaged \$254.27 yearly, supplies \$152.62, and total expenses for each service \$2,027.21.—*Annual Report of Public Health Nursing Service*, Summarized by the Minnesota Department of Health, Division of Child Hygiene.

It will be interesting to see how the average expenditures for these public health nursing services during the year 1932-1933 contrast with the above figures, for it was not until the past summer that the salaries of public health nurses took such an alarming downward curve.

Health Department Nurses Are Behind Here—During the summer of 1932 a study was made of the qualifications of a selected group of Indiana

public health nurses by the Division of Public Health Nursing of the State Board of Health. The measuring rod was "Minimum Qualifications for Those Appointed to Positions in Public Health Nursing," prepared by the Committee on Education of the National Organization for Public Health Nursing and endorsed by the Public Health Nursing Section, the Committee on Training and Personnel, and the Committee on Research and Standards of the American Public Health Association. Here is the result of the study:

	No. Nurses Employed	Per cent of Nurses Qualified
<i>Rural</i> (Nurses working alone or as supervisors)		
Employed by—		
Boards of education...	4	50
Private agencies (Red Cross, T. B. Associa- tion, etc.).....	44	40
County health depart- ment . . . . .	8	17
<i>Urban</i> (Nurses working alone or as supervisors)		
Employed by—		
Boards of education...	39	30
Private agencies . . . . .	43	44
City health depart- ments . . . . .	11	1

The School Nurse Again—Dr. Gillihan, Health Officer of San Luis Obispo County, Calif., says "The school nurse's activities are not to be measured so much by the number of defects she may discover as by the percentage of discovered defects she succeeds in having corrected." He says, too, that the school nurse "is not the one to make these corrections, but her training is such that she makes a

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

perfect 'liaison officer' between the school with its activities, the parents with the home life, and the various agencies, public as well as private, which are interested in securing these corrections."—Allen Gillihan, M.D., School Economics, *Weekly Bull.*, California Dept. of Public Health, XI, 39:154 (Oct. 29), 1932.

Dr. Gillihan is quite right in what he says as far as he goes but he leaves the impression in this article that a school nurse's most important function is getting defects corrected. Something might be said about the need of preventing defects in the first place. This recalls what Dr. Levy of New Jersey said at one of the American Public Health Association meetings in the Child Hygiene Section—that the best time to do preventive school health work is in the infant and preschool years; which could serve as an argument for a generalized nursing service for a community instead of just a school nursing service.

However, it needs to be more widely recognized that a school nurse is concerned with more than the finding and correcting of defects. One may judge what relation this phase of her work holds to her other duties by recounting the National Organization for Public Health Nursing objectives of a public health nursing service to school age groups:

1. To assist in communicable disease control by the recognition of early symptoms and by securing immunization.
2. To assist the physician in medical inspection and in the routine periodic physical examination of every school child.
3. To assist in securing the correction of defects and in promoting health.
4. To assist in securing special examinations and such follow-up as is necessary.
5. To participate in the promotion of

hygiene and sanitation of the school plant.

6. To assist in securing proper instruction of pupils and parents in the principles of healthy living.

7. To provide or supervise adequate nursing care to all sick children.

### Why Keep the Rural Nurse Rural?

—A Kentucky public health nurse tells in the *Bulletin* of the Kentucky State Board of Health why she is glad she has "stayed put" for a number of years in one community instead of becoming a transient nurse which she once dreamed she would like to be. She feels now that one lives and fulfils oneself more fully in a small circle and finds therein in miniature all she would find in a big circle.

This nurse says if she were teaching prospective county public health nurses she would tell them that it takes a nurse a year to know her county, 2 years to really know her people, 3 years for them to know her, and then she is ready to begin work.

She proves the truth of this statement in her own case by recounting how the children gathered in an isolated school house in the hills, used to run screaming from windows and doors "taking to the hills, the trees, the rocks like little wild animals whose meeting place is invaded by a panther," when the public health nurse first arrived to make school inspections. As she says, "In those days a typhoid clinic was opened with prayer and we preached a sermon for every smallpox vaccination we gave."

She contrasts this with the situation 4 years later when she finds the pupils not only eager and willing to take their typhoid and diphtheria inoculation, but parents and grandparents, babies in arms, have walked miles in a blazing sun, 300 of them, to take advantage of the preventive measures they feared so intensely 4 years ago.

She says she wouldn't have missed for anything "this gradual building up, this cautious giving of confidence," the inimitable experience of having watched the "evolution of a people's faith."—Pauline Myers, R.N., In Retrospect, *Bulletin*, State Board of Health of Kentucky, V, 3:10 (Oct.), 1932.

Here perhaps is the answer not so much to "How to Keep the Rural Nurse Rural" which was argued in nursing magazines a few years ago, as

"Why to Keep the Rural Nurse Rural." Public health nursing is educational work, and all education is slow in showing results. But part of the joy of working is seeing results—and the public health nurse who flits from place to place, even to take better positions, misses a great deal of the abiding joy of seeing obstacles in her path slowly overcome and the part she played in the "evolution of a people's faith" in public health.

## EDUCATION AND PUBLICITY\*

*"What we need in the present emergency more than anything else is to spread among the people, and especially among the leaders, a true concept of the importance of public health in the social economy of the nation. This is obviously your duty. You, who represent the strength and leadership of the nation's health workers, must go back to your communities and broadcast the message I have just given you. Sound the alarm and arouse the public to a realization of the situation that is threatening. It is especially desirable that you win the support of your local medical societies, the chambers of commerce, the business men's groups generally, the women's clubs, and particularly the press. Make them all realize that the maintenance of the public health at high levels is vital to the public welfare."*

By President Louis I. Dublin before American Public Health Association at Washington.

The New Chairman—At Washington Mrs. Mary Swain Routzahn, Russell Sage Foundation, was elected chairman of the Public Health Education Section for 1932–1933. Raymond S. Patterson, John Hancock Mutual Life Insurance Company, was reelected secretary.

Send your ideas for next year's program to either of the above.

"Health Plays For School Use"—From American Child Health Association, 450 7th Ave., New York, comes this source list of plays and material about plays in teaching health. Five mimeographed pages. A copy free. From the introduction:

Dramatic expression is so congenial to children that it is natural for the teacher to have faith in a lesson cast in such a form.

It is important, if the richness and depths of a child's imagination and emotional nature are to be permitted free expression in the interest of learning, that the lesson in play form be not only truly imaginative, but also

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

that its factual content ring true, and that the action have, inherent in it, real dramatic possibilities.

In selecting the health plays here listed, an effort has been made to choose those most naturally childlike, most naturally dramatic.

Teachers should remember, however, that the richest vein of dramatic possibilities for learning always lies in the child himself—especially in the little child. His original dramatic expression, in words and action, of an idea that is clearly presented to him and that has become thoroughly familiar, will always have greater educational value than any dramatic activity prearranged for him by others.

**What Happens To Them?**—This is the cover title of a small folder from the Delaware County Tuberculosis Association, Chester, Pa. On the inside pages appears the following "obtained from a study made by . . .":

23 were dead, July 1, 1932, 4 of whom died in the County Home for the Poor.

25 are still in hospitals.

20 were living home or with relatives.

6 had removed from the county.

This is a small part of the story of the 74 persons who were listed as positive cases of tuberculosis at ONE of the tuberculosis clinics in Delaware County, Pa., in 1931.

**57 Years Lost:** The time recorded as lost through sickness by the 61 patients where this information could be obtained was 57 years, 1 month, 17 days.

**30 Years in Hospitals:** The records further showed that 30 years, 10 months, and 15 days had been spent in sanatoria and hospitals by this group of 74 patients.

**Cost to County—\$100,000:** The average individual wage was \$23.45 per week. Their combined earning capacity for the more than 57 years when they were unable to work amounted to \$69,646.50.

The cost of hospital and sanatorium care at \$20.00 per week for the time reported above reaches a total of \$32,040.00.

**Other Interesting Facts:** 9 homes were broken up; 7 patients spent time in the County Home for the Poor; 16 families had 23 previous deaths from tuberculosis; 1 patient had recovered sufficiently to work full time; 6 were working part time; 181 patients were listed for State Sanatoria from Delaware County in 1931. Of this number about 20 per cent were children sent to preventoria.

As H.E.K., who sent it to me, says: "It is a bully idea, though some improvements could be made," especially in the lay-out of the original folder.

Quite different is the 8-page booklet from the Anti-Tuberculosis Association of Jefferson County, 2019 Ave. F, Birmingham, Ala.

"Facts and Figures About Tuberculosis in Jefferson County," the cover title, is not so good. The inside pages are headed: "The Gist Of It," "A Problem," "A Vision," "A Great Task," "A New Outlook." Well localized copy "which has been prepared primarily for the use of leaders in various groups." Very simple line sketches lighten the pages.

**Grand Stand Seats For a Great Campaign**—What may become a most extensive campaign of agitation and presentation touching the health field has just now been launched. The final report of the Committee on the Costs of Medical Care has sharply drawn the issues, and they will be capably laid before the country. Whether or not there is a continuing body, the vast interests involved will provide a self-sustaining public discussion of considerable vigor. It will be of value to health educators to observe from the beginning the growth of public opinion wherever it may go, whatever direction it may take.

Any number of folders describing the final report will be supplied free by University of Chicago Press, 5750 Ellis Ave., Chicago.

**Where Is It in the Report?**—Where is health education mentioned? Few department reports give adequate indexing to health education activities.

In one state department report "educational work" is mentioned under "Maternity division"; "public health education" under "Public health nursing division"; "educational activities,"

"articles published," and "lectures" under "Social hygiene division"; "educational activities" under "Tuberculosis division"; and then a number of sub-headings under "Public health education division." Likewise "research" and "studies" are merely sub-headings under different titles. Research workers, writers and others desiring to gather material from departmental reports will surely miss much material, unless they can take the time to dig through indexes or run through long reports, since many reports lack even inadequate indexes.

Is it not worth while to study how to make the contents of annual reports more usable by citizens and public health workers?

**Journalism Students Writing Up Nurses**—The American Nurses' Association reports a plan which health workers might try in any city or state which has a school of journalism.

All women members of the feature writing class at New York University School of Journalism have been assigned an interview with some nurse whose work is of more than local interest and importance. Professor Helen Scott Mann, who is in charge of the course in feature writing, will assist the students in placing their interviews in Sunday or daily newspapers in the communities covered.

State, district and alumnae associations are asked to name nurses and nursing services worth publicizing either locally or nationally. Names of individual nurses, together with a few facts about their experiences, hobbies, or backgrounds, should be sent to the Department of Public Information, A.N.A. If some approaching event will soon bring these women into prominence that should by all means be mentioned, as timeliness is a big factor even in the human interest or the interview type of newspaper or magazine article.

**Is Men's Clothing a Health Problem?**—"In Germany, while a dog's hair in winter represents only 1.4 per cent of its total weight, the winter clothing of a man represents about 10

per cent of his total weight," according to a statement from the League of Red Cross Societies, Paris. Is this heavy weight of clothing, by itself or in relation to the lighter weight of women's clothes, a factor in colds?

**Discussion, Discussants and Discussion Leaders**—Recently all chairmen of divisions of the National Conference of Social Work have received a "Handbook" of 44 mimeographed pages. Since many readers of this department are interested in planning and conducting meetings some quotations of what is said about discussion should be of interest.

*The use and value of discussion*—When planning the program for an individual meeting the Division Committee should definitely decide in advance whether it wishes discussion and what kind of discussion, and plan definitely for it. A discussion is valuable as it brings out various points of view, criticisms of the material presented or through the use of questions permits the speaker to make clearer some point in his paper or address that perhaps was not cleared up in the formal presentation. It also stimulates new constructive thinking and provides the means for the participation of a larger group in the Conference. Much of the value of discussion can be lost unless careful preparation is made.

*Place of the Discussant or Commentator*—For the purposes of the Conference let us define the discussant as a person who is asked in advance to discuss a particular paper. This person should have access to the manuscript he is to discuss at least three weeks in advance of the Conference. He should confine his remarks to a discussion of that paper rather than the presentation of additional material. As one studies past programs one finds that frequently people asked to comment on a given paper use this opportunity to present an entirely different subject or material that has very little relation to the paper presented. When a person is asked to discuss a particular paper definite time limits should be given and some indication as to the particular contribution desired from the discussant. Every effort should be made to see that he has a copy of the manuscript in ample time to prepare his part of the comment before the Conference.

It may be desirable, at long intervals, to have the full period following a speech (or

several speeches) wholly taken up by discussants who present different points of view or relate different experiences bearing on the subject.

In any case Discussants should not be called Discussion Leaders, or that period of time used by discussants labeled as Discussion.

**Ethics In Hospital Publicity—** An extensive "Report of the Committee on Public Relations," American Hospital Association, 18 East Division St., Chicago, reviews the publicity problems of the hospital, and the use of the principal media. "The committee believes that the submission of the following principles will guide hospitals and similar institutions in carrying on what may be regarded as ethical publicity":

Publicity by clinics, hospitals, sanatoria, and other semi-public medical institutions as to quality of work done implies unusual and exceptional ability and efficiency on the part of their professional staffs, and therefore is advertising of the medical men concerned. This type of advertising distinctly savors of quackery and is unethical.

Publicity by any such institution stating or implying that by reason of its exceptionally fine equipment and material resources it is able to, or does, give the public better medical service than similar institutions are able or willing to render, is advertising for purposes of self-aggrandizement. Statements of this type are frequently exaggerated and misleading and are detrimental to the best interests of the public, of the institutions concerned, and of true medical progress.

From time to time, hospitals, sanatoria, and other similar medical institutions must raise funds from an interested public for capital expenditure and maintenance. Furnishing the public with facts concerning such an institution, its work, its aims, and its ideals is legitimate and desirable. The public is interested in these facts and therefore is entitled to know them. Publicity dealing with these facts is ethical, provided, of course, that it refrains from any comparisons or superlative terms either direct or implied.

Publicity carried on by any one institution should be such as will be beneficial to all like institutions in the community. It should tend to develop public confidence in hospitals, sanatoria, and other medical institutions. It should be free from superlative or

comparative statements and any implication of rate-cutting or unfair competition.

The report includes nearly 5 pages of bibliographical references to material which has appeared in hospital publications. 40 pp. 75 cents.

**What Will You Do About It?—** Every worker in health education is threatened with a reduced budget, yet the need for health education is as great as ever. *What will you do about it?* And what might the Public Health Education Section do to help you?

**How About Third Class Mail?—** Have we carefully examined the possibilities? Many large business houses have been testing first class versus third class. A number of them have found that third class serves many uses as well as first class. A number of them assert that they will continue to use much third class even when first class is reduced to two cents.

Printed, multigraphed, or mimeographed matter may go at third class at 1½ cents for *two* ounces or fraction thereof. If an official permit is secured the same material will go for 1 cent—if mailed in lots of 20 lb. or not less than 200 pieces of the same kind. This permit privilege calls for sorting geographically outside of the mailing city, and the mail must be mailed at the post office and not dropped into a mail box.

The "postage saver" envelopes are safe and need not look cheap. There are plenty of good looking envelopes on the market.

*Printed or duplicated letters sent third class may be signed and individually addressed just like a first class letter.*

The simplest personal touch may be given by pen-writing "Dear Mr. Smith" (or whatever the name is) at the top. But some very successful advertisers are using the letter form, without being individualized.



To get the 1-cent rate any single lot of 200 or more pieces must contain the same enclosures.

### What Is Health Education?—

Annette M. Phelan presents some attitudes and principles in health education in the school, and tells us that

Health Education is a way of living, mentally, emotionally, socially, and physically. It enters into and grows out of all child experiences in the school, the home, and the community. Health is a means to human happiness and achievement and is best thought of as such—not as an end in itself.—

"Health Education For All." *Public Health Nursing*, 450 7th Ave., New York. Dec., 1932. 25 cents.

### "Yes? What's the Name?"—

Such a telephone greeting does not foster good will for a health agency—depression or no depression. Says A. M. Lockhart in *The Rotarian* (Dec., 1932):

After all, telephone calls are substitutes for personal calls. The operator is merely removed from the sight of the person calling. The contact is otherwise personal. The telephone switchboard is indisputably one of the most important outposts of a firm's contact with the outside world. It's the port of entry for the majority of the total contacts a busy man makes during a day's work at his office.

The stewardess of a switchboard functions as a reception committee of one—there to greet, if you please, all the callers who visit by means of the telephone. She is thus in excellent position to make or break a lot of good will.

A writer in *Printers Ink* (Dec., 1932) telling of some experiences by three business men calling at certain offices comments on the good or bad services by several information clerks.

As Mr. Lockhart says: "Receptions of this sort aren't limited to commercial houses, mind you. Secretaries of many professional men are similarly wanting." Might he have included health departments?

At the Foot of the First Column—We discover numerous readers who don't know where to address the editor of this department. Please turn to the first column of this department in any issue of the *Journal* and read the footnote. Whenever you think of it please send your material direct to that address. Then the A.P.H.A. need not spend extra postage in forwarding the material to the editor of this department.

### REPORTING

"Bibliography for the Year," in Annual Report of New York State Dept. of Health, is a record of articles by staff members published in various periodicals.

Some of the page headings in a pamphlet describing and illustrating a hospital: "The Patient an Honored Guest," "The Comforts and Care of Home," "Keeping Down the Cost," "Baby Starts Life Right," "Human Skill in its Highest Attainments," "Economy and Efficiency of Operation," "For Correct Treatment of Disease or Injury," "The Convalescent Patient is Constantly Encouraged," "Correct Foods—Properly Cooked—Served Hot." In "An Ideal Hospital," Presbyterian Hospital of Colorado, Denver.

The 1932 "Year Book" of the United Hospital Fund of New York City, 122 East 22d St., New York, carries explanatory statements with all photographs, such as:

Insulin Keeps Men At Work: Every year hundreds of breadwinners, who would otherwise be helpless invalids, are able to keep on the job with the help of free insulin treatments.

### TIMELY TOPICS

"Forty Million Babies," the world's annual crop, with application to services rendered by *New Haven* to its share of that total. *Health*, Dept. of Health, New Haven. Sept., 1932.

"Poor Eyesight Causes Family Rows," by David Resnick. *Everybody's Health*, St. Paul. Oct., 1932. "Eye hazards to avoid in the home."

Poliomyelitis is given chief attention in Nov., 1932, issue of *Canadian Public Health Journal*, Toronto. 25 cents.

"Man Controls Germs, Runs Amuck Himself." *Illinois Health Messenger*, Springfield. Nov. 15, 1932. Disease vs. automobile deaths.

"Danger to Health in Christmas Hysteria," by Thomas Myers, M.D. *Everybody's Health*, St. Paul, Minn. Dec., 1932. 10 cents. "Nervous, physical collapse and disease epidemics often follow unwise holiday celebrations."

"A Half Century of Change," *Illinois Health Messenger*, State Dept. of Health, Springfield, Ill. Dec. 1, 1932. Changes in occupation, and "a change no less profound and far reaching than that of occupation, but for a different reason, has taken place in respect to the hazards of health and the causes of mortality in Illinois." May be adapted to other states and to cities.

#### PUBLICITY PRESENTATION

The Illinois Conference of Public Health Officers and Nurses, Dec. 15-16, 1932, included these topics: "The Public Health Job of the Parent-Teacher Association," "Non-professional People in Public Health Work," "Educating the Public in Health Matters" (Dr. W. W. Bauer), "Utilizing Organized Groups in a County Nursing Program."

"Popular Health Education vs. The Medical Charlatan" was presented at

New Jersey Conference of Social Work by American Social Hygiene Assn.: "Can We Be Duped?" and "Campaigning Against Quackery."

Dr. Iago Galdston conducted a clinic on public speaking before the Social Work Publicity Council, Detroit, Nov. 8.

In *New Mexico Health Officer*, Bureau of Health, Santa Fe (Oct., 1932), Eleanor L. Kennedy, says:

The object of publicity in public health nursing is to show the people what the nurse is doing for the improvement of their health in such a way that they've just got to help her and support her work. In addition, the knowledge of your work educates the people to a higher estimation of the value of health to themselves, and as a community responsibility.

#### DEPRESSION

"The Health of the People in a Year of Depression," by Dr. Louis I. Dublin. *American Journal of Public Health*. Nov., 1932. A presidential address.

"The Menace to National Health," by James A. Tobey. *Current History*, New York Times Bldg., New York. Dec., 1932. 25 cents. The conclusions of the article "may seem pessimistic, but they should be regarded as a warning not to jeopardize the health of the nation."

"Unwise Economy May Affect Future Health," Dr. S. W. Sayer, New York State Dept. of Health, Albany. Radio talk. Enclose 3 cents.

"Health Service Vital," a one-page statement of need of maintenance of health departments. Oregon State Board of Health. Nov. 22, 1932.

Depression cartoons appearing in the Health Bulletin Service of the A.P.H.A. have been used in various parts of the country.

## BOOKS AND REPORTS

**Alcohol and Man**—*Edited by Haven Emerson, M.D.* New York: Macmillan, 1932. 451 pp. Price, \$3.50.

This volume presents many of the same difficulties for a review as *Prohibition: A National Experiment*. It consists of a series of articles by 22 authors, most of them men engaged in the sciences connected with biology and medicine. Others are connected with life insurance companies and statistical bureaus. Every question is treated apparently without bias, and facts, as brought out by scientific experiment, are given. We wish it were possible to give quotations at some length.

The conclusions of the authors as a group are fairly represented in the preface which, under the circumstances, make the best review that can be given. It is agreed that education in the basic facts concerning alcohol is essential to the best interest of man and his social organization; that there is much need of rewriting the texts and courses in physiology, hygiene and health offered to the children of the country in so far as the teaching of the effects of alcohol on man is included in state laws, or by regulation by boards of education; that an obligation rested on the contributors to assemble and present for the use of the educated laity facts concerning alcohol in its biological and human relationships, and that throughout the text, facts and opinions should be supported by available references, regardless of their bearing upon the current controversies as to the wisdom or desirability of continuing the 18th Amendment.

The authors have avoided the use of terms implying bias on one side or the other, and state that in no instance have they been aided financially, or supported in any way, by either the

advocates or opponents of federal prohibition or of the liquor trade. They have included an excellent article by Drs. Langmead and Hunt of England on the effect of alcohol on the body's resistance to infection. The names of the writers of the various chapters give assurance that they are authoritative and embody the latest and most accurate results of research.

It is hard to speak too highly of this production. It comes at a time when exact knowledge will be of great value, though as pointed out by the editors of *Prohibition: A National Experiment*, the question of legal control is not likely to be settled on scientific evidence. However, exact knowledge must have an influence, even on the biased and emotional. We believe the volume will be of especial use to physicians and social workers, and we hope that those entrusted with the formulation of laws and regulations will also study it. For the doctors, the chapters on the physiological effects and therapeutic use of alcohol will be of particular interest.

The make-up of the book is excellent; and a good index of authors as well as one of subjects adds to its value.

MAZÛCK P. RAVENEL

**Prohibition—A National Experiment**—*Edited by James H. S. Bossard, Ph.D., and Thorsten Sellin, Ph.D.* Philadelphia: American Academy of Political and Social Science, 1932. 269 pp. Price, \$2.50 (cloth), or \$2.00 (paper).

The question of the use of liquor will not down. The Democrats have declared openly for repeal of the prohibition law. The Republicans declared that present conditions could not continue, which was paramount to acknowledging the failure of prohibition as it

now stands. Under any circumstances, the question is a live one in both parties, and there is no question that strenuous efforts will soon be made to repeal the law. The result will be many and long discussions for and against the use of liquor.

The volume before us is an attempt to get at some of the underlying facts. For some 10 years the American Academy of Political and Social Science has published articles on the subject.

This book does not lend itself readily to review, containing as it does articles by 24 authors, ranging from Deets Picket and Clarence True Wilson on the one hand, to Rufus S. Lusk on the other. Several are written by men connected with the Bureau of Prohibition, for example, "The Illegal Liquor Traffic." It is possible to accept the statements as being correct as far as official records go, but as it is well known that there is no record of the illegal traffic—and that is what we are principally concerned in at the moment—it is manifest that the estimates are more than likely to be very far from the truth. On the one hand, Mr. Woodcock, Director of Prohibition, estimates the annual consumption of liquor at 800 million gallons, while the Association against the Prohibition Amendment estimates it at 1,100 million. The same difficulty exists in regard to the illegal traffic in narcotics. Other articles are from those who have no reason for bias, but there is conflict of opinions, and the best that can be said of most of them is that they are opinions, however sincere the authors may be, or however much they believe in the facts or alleged facts on which their ideas are based.

The editors in their "Foreword" tell us what we all know—that there are no complete statistical data available for a conclusive analysis of the effects of prohibition; that the question will probably never be settled by scientific

treatment; and that the whole question is bound up with emotional attitudes which make dispassionate and scientific treatment difficult. However, whatever we may think of these discussions, and whether we believe all of them to be sincere or not, they furnish interesting reading and bring up many questions which those interested in temperance must consider.

Perhaps the most valuable part of the book consists of the 5 articles concerning the control of liquor in Canada, Great Britain, Sweden, Finland, and Russia. The medical articles concerning mortality and morbidity and mental hygiene are among the best and most useful. It is interesting to note the conclusion of unbiased writers that prohibition has had less effect on economic welfare—favorable or unfavorable—than is claimed either by its supporters or opponents; that it is extremely difficult, if indeed possible, to establish any direct relationship between modification of the 18th Amendment and the general agricultural situation; that no definite conclusion can be arrived at as to the direct part played by prohibition in increasing crime; that while there was a marked reduction in alcoholic psychoses in 1919–1920, there has been a notable increase in such psychoses as well as deaths since 1920, and an even more notable increase in alcoholism without psychosis, during the past 5 years.

This volume can be heartily commended to all who are interested in this subject—and what thinking man is not at this time? MAZÛCK P. RAVENEL

*Principles of Chemistry*—By J. H. Roe. (3rd ed.) St. Louis: Mosby, 1932. 486 pp. Price, \$2.50.

Elementary science courses are a recognized part of the early training of student nurses. The difficulties in selection and presentation of suitable material can be appreciated fully only by those who have attempted to give

such courses. Criticism of any text prepared for the above purpose is not easy to make.

This book contains sufficiently complete discussions of a few elements—hydrogen, oxygen, and nitrogen, and very brief mention of a considerable variety of inorganic compounds quite apparently chosen because they are likely to be encountered, at least in name, by nurses. Organic chemistry has not been neglected. Chapters dealing with carbohydrates, proteins, fats, and vitamins, are followed by discussion of foods and nutrition and secretions and excretions. A course of laboratory experiments is included. The author has done an almost impossible task in a distinctly acceptable manner.

JOHN F. NORTON

**Mental Deficiency Due to Birth Injuries**—By *Edgar A. Doll, Ph.D., Winthrop M. Phelps, M.D., and Ruth Taylor Melcher.* New York: Macmillan, 1932. 289 pp. Price, \$4.50.

This is a timely volume which sets forth in well-balanced chapters the various factors contributing to injury of the nervous system incidental to childbearing. At present so much attention is being focused upon maternal and neonatal mortality that we are apt to overlook the serious damage due to birth injury in those who survive. Injury at birth is one of the prime factors in early infant mortality. Undoubtedly it also is the cause of a considerable number of cases of motor paralysis and mental retardation; "although they constitute but a small proportion of all mentally deficient children." The authors state that the risk "is especially serious among first born children, is present in an apparently normal birth as well as in those where natural labor is unusually severe or prolonged, and in those which require instrumental delivery."

The introduction and the chapter on Etiology indicate the varieties of injuries, the predisposing and causative factors, and the symptoms of intracranial injuries. The carefully selected case studies are particularly helpful in understanding the location and extent of the damage which may follow severe birth injuries. Chapters on Mental Tests and Measurements, Mental Estimates, and Mental Growth round out the volume. A practical consideration of physical therapy also is given.

The high quality of printing and illustrations of the Macmillan Company is maintained in this volume.

RICHARD A. BOLT

**Medicine and the State.** The relation between the private and official practice of medicine with special reference to public health—By *Sir Arthur Newsholme, K.C.B., M.D., F.R.C.P.* Baltimore: Williams & Wilkins, 1932. 295 pp. Price, \$3.50.

This book is the fourth and final volume of a series of "International Studies" conducted by the author for the Millbank Memorial Fund. It is, however, to a very considerable extent, independent of the other three volumes, although, necessarily, many of the conclusions expressed in this volume are based on facts published and analyzed in the previous volumes.

Briefly, the author reports the results of his survey of the existing relations between the practice of medicine in all of its branches and the activities of the various governments concerned in Western Europe with regard to the medical care of their peoples. In this connection he gives special consideration to four groups of medical services, which constitute the most recent advances in public health, i.e., the medical care of maternity, child health, and the treatment and prevention of tuberculosis and venereal diseases.

The operation of hospitals and clinics with special reference to their relations with the medical profession on one hand and the public and the state on the other is discussed at length. The chief varieties of medical practice, including group medicine, state medicine and insurance medical practice, are reviewed, analyzed and criticised. The author maintains emphatically that the health of the individual citizen is a communal as well as an individual concern. He concludes that the developments in medicine have been such as to require close coöperation between general practitioners and consultants. He also finds that the official phases of both prevention and treatment should come under a single directing authority.

Sir Arthur Newsholme is peculiarly well fitted to investigate and discuss the extremely important and pertinent subject of the relations between medicine and the State. His years of experience in health work in England, his varied contacts with the practice of medicine in his own country and abroad, and his knowledge and experience with social and governmental problems have gained him unexcelled qualifications for this work.

In some instances, the views expressed by the author might be regarded as open to criticism when applied to conditions in America. Nevertheless while the problems considered are those existing in Western Europe, still any health officer in this country should find in this book much food for thought and numerous sources of inspiration in dealing with the many administrative activities involving the private practitioners.

GEORGE C. DUNHAM

*Industrial Psychology* — *Morris S. Viteles*. New York: Norton, 1932. 652 pp. Price, \$5.50.

The subject of industrial psychology continues to engage increasing attention, as the present extensive volume of

rather closely written pages, numerous tables, figures, and a limited number of photographs shows. We have already reviewed in these pages more or less similar works by the Gilbreths, Scott, Anderson, Burt, Hill and others, and are pleased to receive this work from an academician who has had years of industrial experience of consulting and research nature in connection with various leading industries in the United States, and who combines an extensive European literature with that of American origin.

In the twenty years since Münsterberg presented the first systematic formulation of the problems and scopes of an industrial psychology, there has become available a wealth of experimental data and concrete achievements in increasing the effectiveness and happiness of man in industry. The present work reviews the new technics, new equipment, and new viewpoints, and discusses many of the fundamental problems of general and applied psychology as well as the relation of these to the industrial situation.

The work is divided into three main sections: The foundations of industrial psychology, fitting the worker to the job, and maintaining fitness at work—the total comprising 27 chapters. The plan has been to develop the subject somewhat in its historical aspects, to integrate industry and psychology, and to stress the inseparability of the two. Both manual and mental occupations are considered as well as the modifications which physiological and environmental influences introduce. The chapters on motives in industry, the maladjusted worker, and problems of supervision are monographic in themselves. There is a breadth and comprehensiveness about all of the subjects treated which is both informational and edifying, and throughout tempered with commensurate conservatism.

Written by one who is not only en-

thusiastic but thoroughly familiar with the scope and trend of his subject, the book lends itself to personnel, medical, and health specialists and all who are interested in efficiency from the human element standpoint.

Fortunately the numerous citations and acknowledgments appear both on the respective pages and in separate lists alphabetically arranged at the rear of the volume, to which an extensive subject index is added. The work is dedicated to two outstanding teachers at the University of Pennsylvania—Witmer and Twitmyer—while the publishers are to be commended on quality, style and format.

EMERY R. HAYHURST

**A Text-Book of Human Physiology for College Students—***By August Krogh, revised and edited by Katherine R. Drinker. Philadelphia: Lea & Febiger, 1932. 233 pp. Price, \$2.75.*

This small textbook originally published in Danish in 1908 is now reëdited and translated into English for the use of college students. A concise account of the physiological functions of the body is given in 13 short chapters and 83 experiments are outlined in the appendix for the elucidation of the subject matter of the text.

The opening chapter deals with the Chemical Constituents of the Human Organism and is followed by one on the Digestion and Absorption of Food. Each succeeding chapter is a logical outcome of the preceding one and profuse illustrations, the majority of which are taken from standard textbooks, contrive to make the book complete in itself. In the later chapters the physiology of the nervous system and of the special sense-organs is outlined.

Some statements could with advantage be improved; for example, solutions of polysaccharids (p. 20) and

a solution of protein (p. 22) are said to be "slimy," and again "sugar passes unchanged through the (intestinal) epithelium" (p. 44). Less ambiguity would result if the word "dextrose" were substituted for sugar.

The book contains useful information, is excellently printed and may confidently be recommended as a suitable introduction to larger text-books on the subject.

JOHN WYLLIE

**Pulmonary Tuberculosis—***By Maurice Fishberg. (4th ed.) Philadelphia: Lea & Febiger. 1191 pp. Price, \$15.00 for 2 Vols.*

This book, in 2 volumes, is the best book now on the subject in the English language. Over 300 pages and over 100 new illustrations, largely roentgenograms, have been added. Etiology, pathogenesis, symptomatology, roentgenology and clinical forms are in the first volume.

One of the great assets of this book is the frankness and courage of the author. He questions whether the great modern antituberculosis campaign has really accomplished anything worthy of note. The number of the infected is no less today than 30 years ago. Again the tuberculosis mortality rates follow closely the general mortality rates.

His discussion of the tubercle bacillus is excellent, but mentions dissociation only under BCG. He still affirms that tuberculous exogenous (?) infection can occur only once and entirely sweeps aside the view, now widely held, that exogenous reinfection by inhalation is the usual cause of phthisis. The chapter on roentgenography is well done, and wisely illustrated. The importance of this method in the diagnosis of many lesions, the extent of the lesions, and their relations to the physical signs, is well brought out.

The second volume begins with the disease in children, points out that

the roentgenogram is of less value in diagnosis in infantile than in childhood tuberculosis, and of no practical value in the diagnosis of complicating intestinal tuberculosis. He finds heliotherapy of no value in the treatment of this condition. So much evidence has accumulated in this country and Europe to show that he is mistaken that it is only necessary to mention it as a blemish in a good book. Pregnancy is of little moment in arrested tuberculosis. Insulin in ordinary doses, he thinks, may cause focal reaction which the reviewer has not noted.

The reader is left to infer that some danger lurks in the immunizing use of BCG. Heliotherapy may provoke unwelcome reactions but the reviewer has never noted it in any case of pulmonary tuberculosis following the use of the ultra-violet ray lamp. Gerson's salt-free and high vitamin diet has no scientific foundation, he thinks, and no effect on the pulmonary disease. He attributes no value to tuberculin and sanocrysin.

The surgical treatment of the disease is fully dealt with, and here also his experience leads him to views different from those held by many. He cautions against too prolonged collapse of the lung in artificial pneumothorax and opposes the very beneficial operation of intrapleural pneumolysis. He leads one to infer that thoracoplasty does little more in many cases than prolong life. He dwells upon the dangers of oleothorax.

The reviewer differs from the author in many instances but he has found the book refreshing in its frankness and stimulating in its discussions. There is some suggestion that personal likes and dislikes have crept in here and there. For those engaged in public health work, we can heartily recommend many chapters in the first volume, for even when some statements are unorthodox—and they are not infre-

quently so—they lead to the clarification of the faith that is within one. The book represents a vast amount of study and a great clinical experience, though at times one is led to wonder if it has not been drawn a little too much from the more advanced cases. Every worker in tuberculosis should have access to these valuable volumes at all times. LAWRASON BROWN

*Principles and Methods of Sociology*  
—By James M. Reinhardt and George R. Davies. New York: Prentice-Hall, 1932. 685 pp., Price, \$3.50.

Nothing illustrates the ill-defined character of sociology as a scientific discipline better than the extraordinary differences in the treatises pretending to set it forth in a systematic and fundamental manner. The above work is in this respect in line with expectations. Like most others also it has its own special claim to uniqueness and to attention. Without defining sociology, it presents in Part I, social process, some study of methods and an extended treatment of conflict and coöperation. In Part II attention is devoted to Factors Conditioning Society, and in Part III to Institutional Aspects of Society. The topics in these last two parts are those now commonly included in elementary college texts. The treatment is topical and systematic rather than exhaustive and original, being designed to give a comprehensive orientation to the student.

The authors tell us in the Preface:

Primarily it is a philosophy of history in which a new interpretation of economics derived from statistical and mathematical analysis takes the central place. It sees the "residues" (after Pareto) of the historic process largely in terms of the economic consequences of trade relations.

This is a too ambitious statement of the actual achievement, for this philosophy is far from systematic state-



ment in the text. Nevertheless, this viewpoint serves to explain the numerous very interesting statistical studies inserted throughout the text. These are done with a neatness and clarity that could not be surpassed. If they seem at times to be thrust into the text at points that appear to me merely the most convenient rather than the strictly logical ones, they will nevertheless be generally widely approved not merely as contributions to our understanding of social phenomena but as excellent teaching devices. By means of them the beginning student will learn what is meant by a correlation coefficient and something of how it is found.

F. H. HANKINS

**Child Labor.** *Report of the Subcommittee on Child Labor of the White House Conference on Child Health and Protection.* New York: Century, 1932. 592 pp. Price, \$5.00.

In this report there has been brought together, for the first time, all available material bearing upon the subject of child labor in the United States. The data has been assembled largely from reports of previous studies and surveys published from time to time by the United States Children's Bureau and the National Child Labor Committee. Unfortunately it was not possible to obtain the census figures for 1930, as undoubtedly there have been certain changes in industrial and geographical distribution since 1920.

The volume is arranged conveniently for reference purposes. It contains an exhaustive bibliography and an excellent index. Part I considers the non-agricultural occupations with detailed analyses, a general summary, and recommendations. Part II is devoted to employment of children in agriculture. Part III clearly depicts the hazardous occupations and discusses industrial accidents and the administra-

tion of workmen's compensation. This subject is continued in Part IV, where more detailed consideration is given to the administration of laws affecting employment of minors. Recommendations for employment certificates, school attendance, and industrial inspection are given. The concluding part is composed of supplementary reports, which include the New York law on employment of children in theatrical performances and the physical condition of children entering industry in a number of cities.

This volume is a good reference book for those who desire a clear idea of what the child labor movement in this country really means.

RICHARD A. BOLT

**Body Mechanics: Education and Practice.** *Report of the Subcommittee on Orthopedics and Body Mechanics.* Robert B. Osgood, M.D., Chairman. *Publication of White House Conference on Child Health and Protection.* New York: Century, 1932. 166 pp. Price, \$1.50.

This report has assembled a great deal of scattered material on body mechanics in relation to physical fitness and health of children. The term body mechanics is preferred to that of posture, which the committee feels has a more limited and less precise meaning.

Body mechanics may be defined as the mechanical correlation of the various systems of the body with special reference to the skeletal, muscular and visceral systems and their neurological associations. Normal body mechanics may be said to obtain when this mechanical correlation is most favorable to the function of these systems.

It is pointed out that poor body mechanics may be developed very gradually and their immediate effects not noticed on account of partial or complete compensation. The various factors contributing to poor body mechanics are discussed.

About half of the volume is taken up by a reprint from the United States Children's Bureau on *Posture and Physical Fitness* by Dr. Armin Klein and Leah C. Thomas. The appendix contains also a reprint from the Boston Public Schools on a *Course in Physical Education for the Day Elementary and Day Intermediate Schools*.

The report cautions against accepting any one type of individual or group of individuals as the standard norm for good body mechanics. Different types of body build should be compared and evaluated. Detailed recommendations and suggestions for corrective exercises are set forth, which are of value in guiding those concerned with the growing child.

The Sub-committee concludes that

. . . further investigation and larger and longer surveys are most to be desired, but the Sub-committee is of the opinion that the evidence presented strongly suggests that there exists an intimate association between good body mechanics and good functional health and between poor body mechanics and poor functional health, and that this association may well represent a causal relation in many instances.

RICHARD A. BOLT

**Environmental Factors in Negro Elementary Education**—By Clark Foreman. New York: Norton, 1932. 88 pp. Price, \$1.00.

The place of environmental factors in conditioning results of educational achievement tests is recognized by most psychologists. In this treatise the author has presented a description of environmental conditions which he believes profoundly modify the educational achievement of negro children in southern elementary schools. He concludes from the data collected that evidence exists to the effect that as the environment of negro children approaches in similarity to that of white children they approximate the norm of white children in educational achieve-

ment. The significance of health as a factor is admitted (pp. 50-55) but the difficulty of securing evidence as to the effect of health conditions on achievement compels the author to dismiss this consideration with little attention. This volume should be of interest to students and other workers in the field of negro education.

FRANKLIN O. NICHOLS

**An Introduction to Practical Bacteriology**—By T. J. Mackie and J. E. McCartney. (3rd ed.) New York: Wood, 1931. 421 pp. Price, \$3.50.

This book measures up fairly well to its subtitle, namely, "A Guide to Bacteriological Laboratory Work." Although it is only 3 years since the second edition appeared, the authors have subjected the book to a rather thorough overhauling. Some of the material of the former edition has been omitted and considerable new information added. Having the needs of the junior student in mind, the text has been divided into large and small type matter, the first having to do with the more essential and fundamental part of the subject.

With the exceptions of a few diagrams, illustrations are omitted, the book being intended as a guide in a laboratory course where the various apparatus, microscopic appearances, cultural characteristics, biochemical and serological reactions, are adequately demonstrated. An attempt is made to emphasize the more important methods used in routine bacteriological diagnosis, those which the authors have found most serviceable being recommended. Due attention has been given to the diagnosis of tropical infections.

This publication has value other than as a guide, for it deals rather freely with principles. Both the general student and the practitioner will find it useful, although it was written more especially for the bacteriologist. C. F. ADAMS

Proceedings Sixth Annual Conference, The Maryland-Delaware Water and Sewerage Association, Cumberland, Maryland—1932.

The proceedings of the Sixth Annual Conference of the Maryland-Delaware Water and Sewerage Association contains a valuable symposium on stream pollution control in which the laws,

policies, accomplishments, coöperative studies, agreements and the like in the states of Delaware, Pennsylvania, West Virginia, and Maryland are explained and amplified. Other papers discuss the admission of industrial wastes to sewers, the influence of soils, rocks and minerals upon water potability, activated carbon, and a new dam. A. P. M.

## BOOKS RECEIVED

**STREPTOCOCCI IN RELATION TO MAN IN HEALTH AND DISEASE.** By Anna W. Williams and William H. Park. Baltimore: Williams & Wilkins, 1932. 260 pp. Price, \$5.00.

**POLIOMYELITIS.** By International Committee for the Study of Infantile Paralysis. Baltimore: Williams & Wilkins, 1932. 562 pp. Price, \$6.00.

**FARM AND VILLAGE HOUSING.** Report of Committee on Farm and Village Housing. The President's Conference on Home Building and Home Ownership, Washington, D. C. 1932. 293 pp. Price, \$1.15.

**A GUIDE TO HUMAN PARASITOLOGY FOR MEDICAL PRACTITIONERS.** By D. B. Blacklock and T. Southwell. Baltimore: Williams and Wilkins, 1932. 271 pp. Price, \$4.00.

**MANUAL OF MICROBIOLOGY.** By Walter L. Obold and Margaret M. Diehm. Philadelphia: Davis, 1932. 140 pp. Price, \$1.25.

**STUDIES OF SCHOOL VENTILATION.** Collected reprints of the New York Commission on Ventilation. New York: Teachers College, 1932. 35 pp.

**OUTLINE OF PREVENTIVE MEDICINE.** For Medical Practitioners and Students. 2d ed. By the Committee on Public Health Relations, New York Academy of Medicine. New York: Hoeber, 1932. 462 pp. Price, \$5.00.

**BACTERIOLOGY FOR NURSES, WITH A LABORATORY MANUAL.** By Royall M. Calder. Philadelphia: Saunders, 1932. 285 pp. Price, \$2.00.

**CORRECTION OF DEFECTIVE SPEECH.** By Edwin Burket Twitmyer and Yale Samuel Nathanson. Philadelphia: Blakiston, 1932. 413 pp. Price, \$3.50.

**UNIVERSITY STUDENT HEALTH SERVICE.** Publications of the Committee on the Costs of Medical Care: No. 19. By Don M. Griswold and Hazel I. Spicer. Chicago: University of Chicago Press, 1932. 114 pp. Price, \$.90.

**HOME OWNERSHIP, INCOME AND TYPES OF DWELLINGS.** The President's Conference

on Home Building and Home Ownership. Washington, D. C., 1932. 230 pp. Price, \$1.15.

**MEN AGAINST DEATH.** By Paul de Kruif. New York: Harcourt, Brace, 1932. 363 pp. Price, \$3.50.

**FINAL REPORT OF THE COMMISSION ON MEDICAL EDUCATION.** New York, 1932. 560 pp.

**CANCER: THEN AND NOW.** By New York City Cancer Committee. New York: Chemical Foundation, 1932. 80 pp. Price, \$1.00.

**TEACHING NUTRITION TO BOYS AND GIRLS.** By Mary Swartz Rose. New York: Macmillan, 1932. 196 pp. Price, \$2.00.

**PLANNING AND BUILDING THE CITY OF WASHINGTON.** Edited by Frederick Haynes Newell. Washington: Ransdell, 1932. 254 pp. Price, \$2.00.

**LIFE BEGINS AT FORTY.** By Walter B. Pitkin. New York: McGraw-Hill, 1932. 175 pp. Price, \$1.50.

**FOOD AND CHARACTER.** By Louis Berman. New York: Houghton Mifflin, 1932. 364 pp. Price, \$3.50.

**MEDICOLEGAL CASES.** Abstracts of Court Decisions. 1926-1930. Edited by William C. Woodward. Chicago: American Medical Association, 1932. 1336 pp. Price, \$7.00.

**PH AND ITS PRACTICAL APPLICATIONS.** A New Handbook and Reference Work. By Frank L. LaMotte, William R. Kenny and Allen B. Reed. Baltimore: Williams & Wilkins, 1932. 262 pp. Price, \$3.50.

**FACTS AND QUACKERY IN HEALING.** By Morris Fishbein. New York: Covici Friede, 1932. 384 pp. Price, \$3.50.

**HOUSING OBJECTIVES AND PROGRAMS.** Addresses by President Hoover, Mrs. Jane Deeter Rippin and Secretary Wilbur. Washington, D. C.: President's Conference on Home Building and Home Ownership, 1932. 345 pp. Price, \$1.15.

**SYLLABUS OF MEDICAL HISTORY.** By Victor Robinson. New York: Froben Press, 1933. 110 pp. Price, \$1.00.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Symposium on Dentistry and Health**—This series of papers discusses the relations of dentistry and nearly every specialty in medicine, ending with the health triangle, "physician, dentist and patient."

ATKINS, R. T. *et al.* Diseases of Common Interest to the Dentist and Oto-Laryngologist. New York State J. Med. 32, 21:1221 (Nov. 1), 1932.

**Undulant Fever in Ireland**—In a series of papers the status of *Br. abortus* infection, in man and animals, and its spread through milk are presented at length.

BIGGER, J. W. *Br. Abortus* Infection in Ireland. J. State Med. 4, 11:642 (Nov.), 1932.

**Influenza Results**—During epidemics of influenza the death rates for diseases other than influenza and pneumonia (about 40 per cent of the excess mortality) rise to present a picture strikingly similar in time distribution to the curve of the influenza and pneumonia rates. Excess deaths in which influenza was given as a contributory cause account for only half the increase.

COLLINS, S. D. Excess Mortality From Causes Other Than Influenza and Pneumonia During Influenza Epidemics. Pub. Health Rep. 47, 46:2159 (Nov. 11), 1932.

**Practical Mental Hygiene**—Traveling diagnostic clinics in Massachusetts have accomplished the tremendous job of giving mental examinations and diagnoses to 41,000 mentally retarded school children. The value of this work to society must be great.

DAYTON, N. A. The Walter E. Fernald Plan for the Examination of Retarded School Children. New Eng. J. Med. 207, 21:914 (Nov. 24), 1932.

**Future Medicine and Health**—The long awaited final report of the

Committee on Costs is summarized. The recommendation for publicly supported hospital centers providing medical services for all will not warm the hearts of those, like this reviewer, who don't like hospitals, and who want the comfort and security of the family doctor. However, the insistence upon really adequate health services will receive a loud Amen.

EMERSON, H. Medical Care for All of Us. Survey 68, 17:629 (Dec. 1), 1932.

**Plague in Peru**—Study of many years of endemic plague in Peru reveals that the incidence is greatest in cities in which the rat harborage of buildings is worst, regardless of climatic location. The value of rat proofing is well illustrated.

ESKEY, C. R. Epidemiological Study of Plague in Peru. Pub. Health Rep. 47, 47:2191 (Nov. 18), 1932.

**Dental Caries**—We learn in the first of these two papers that caries is a "saprophytic phenomenon occurring in morphological fissures, developmental enamel faults, or in the permeable necks of teeth," and that the prevention of decay can be accomplished only by rendering the mouth unsuitable to the saprophytes concerned or by breeding a race free from crevices, faults and receding gums. The second paper outlines the dietary principles now generally accepted by hygienists.

FISH, E. W. and MELLANBY, M. Aetiology of Dental Caries. Brit. M. J. No. 3746 (Oct. 22), 1932.

**Amebic Dysentery**—House flies may be a factor in the spread of *E. histolytica* in the community studied, but none of the animals closely associated with man act as reservoir hosts, or assist in the transmission of, the parasite. So concludes an interesting study.

FRYE, W. W. and MELENEX, H. E. In-

vestigations of *Endamoeba Histolytica* and Other Intestinal Protozoa in Tennessee: IV. A Study of Flies, Rats, Mice and Some Domestic Animals As Possible Carriers of the Intestinal Protozoa of Man in a Rural Community. *Am. J. Hyg.* 16, 3:729 (Nov.), 1932.

**School Health Results**—A school superintendent presents the evidence he finds of the improvement in the health of school children following upon the adoption of the health program.

HAMMOND, W. E. Checking the Efficiency of a School Health Program. *Pub. Health Nurs.* 24, 11:592 (Nov.), 1932.

**Early Indian Health**—This story of the health conditions and medical practices among the American aborigines will prove a valuable historical reference. It is significant that the settlers caught no epidemic diseases from the Indians, whereas they gave them plenty.

HRDLICKA, A. Disease, Medicine and Surgery Among the American Aborigines. *J.A.M.A.* 99, 20:1661 (Nov. 12), 1932.

**Milk Bottle Caps**—Will two caps on a bottle of milk keep out more bacteria than one? The answer is, yes, and 16 pages of argument, tables and graphs are taken to prove it. "Under certain conditions," concludes the paper, "milk in bottles sealed with the ordinary disc type cap may present a definite hazard to health." So another bogey is arising to make us more skeptical about the milk we bring ourselves to drink.

ISAACS, M. L. and ZERBER, I. A Comparative Study of Milk in Bottles with Single and Double Caps. *Am. J. Hyg.* 16, 3:806 (Nov.), 1932.

**Testing Adults for Tuberculosis**—The technic of a quantitative tuber-

culin test for adults is described. The author claims for it a 90 per cent accuracy equal to that of the routine test applied to children.

KING, R. B. A Tuberculin Test of Value in Adults. *New Eng. J. Med.* 207, 19:831 (Nov. 10), 1932.

**Postpartum Care**—"The ultimated welfare of the parturient woman cannot be secured by good antepartum and intrapartum care alone, but requires equally good postpartum attention." This conclusion precedes the enumeration of the factors that constitute good after-care of the mother.

LITZENBERGER, J. C. Preventable Invalidism Following Childbirth. *J.A.M.A.* 99, 21:1740 (Nov. 19), 1932.

**Harvey's Contribution to Public Health**—It seems that we are indebted to Harvey for far more than the demonstration of the circulation of the blood which laid the foundations of physiology and modern preventive medicine, for the movements which his work initiated were the beginning of present-day health administration.

NEWMAN, G. The Debt of Preventive Medicine to Harvey and the College of Physicians. *Lancet* 223, 17:877 (Oct. 22), 1932; *Brit. M. J.* No. 3746 (Oct. 22), 1932.

**Bacterial Transformations**—To date seven different pathogenic bacteria have been transformed from the visible state to the filter passing stage and back again to the ordinary condition. The practical application of these studies is set forth in this excellent non-technical radio talk on this new but highly important subject. It is well worth reading by health workers.

SIMONDS, J. P. Making Bacteria Invisible and Its Significance. *Sci. Month.*, Dec., 1932, p. 481.

## NEWS FROM THE FIELD

### PUBLIC HEALTH NURSING CONTEST

THE winner of the first prize in a case story contest conducted by *Public Health Nursing* was Mary H. Emberton, a supervisor on the Visiting Nurse Association staff in Denver. There were 124 manuscripts submitted. The second prize was awarded to Charlotte M. Young, R.N., whose manuscript was submitted by Florence E. McClinchey, of Mount Pleasant, Mich. Edith M. McCarthy, of Medford, Mass., won third prize.

### STUDENT HEALTH ASSOCIATION MEETING

THE 13th Annual Meeting of the American Student Health Association was held December 28-29, in New York City, in conjunction with the Society of Directors of Physical Education in Colleges, the American Football Coaches' Association, and the National Collegiate Athletic Association.

### WESTERN BRANCH MEETING

THE Western Branch A.P.H.A. meeting will be held in Pasadena, Calif., May 29-31.

### NEW JERSEY EDUCATION SURVEY

DR. ROBERT P. FISCHER, Secretary and Chief Chemist of the Board of Pharmacy of the State of New Jersey has been appointed a member of the State Educational Survey Commission. The duties of the Commission are to survey the educational system of the state and to propose recommendations for an essential program of modern education and methods of financing it. The Commission includes the State

Commissioner of Education, a number of school superintendents and principals and a number of prominent laymen, all of whom will serve without pay. Thomas N. McCarter, President of the Public Service Corporation of New Jersey, is the Chairman of the Commission and Albert Payson Terhune, the well-known author, is one of the members.

### STANDARDS APPROVED

TWO sets of standards "Essential Features in the Design of Sanitary Drinking Fountains" and "Minimum Qualifications for Those Appointed to Positions in Public Health Nursing" have been formally approved by the Committee on Research and Standards and by the Governing Council of the American Public Health Association. These standards which have already been printed, the first in the *1930 Year Book* and the other in the *American Journal of Public Health*, May, 1931, were prepared by the Committee on Plumbing of the American Public Health Association together with the Conference of State Sanitary Engineers and the Committee on Education of the National Organization for Public Health Nursing respectively.

### NEW YORK STATE SEWAGE WORKS ASSOCIATION

THE Fifth Annual Meeting of the New York State Sewage Works Association will be held in New York, January 17. In the evening the association will join the Sanitary Engineering Division of the American Society of Civil Engineers at their annual dinner at the Hotel McAlpin.

## THE SIN OF BEING DULL

**B**EING dull is one of "The Six Deadly Sins," attributed by Guy Holt to those who make and distribute books.

The sin of being dull. That is peculiarly a writer's sin, but it is one which publishers too often encourage. We overlook, I fear, the fact that anything no matter of what moment is lifeless if it be not interestingly presented. We begin in the schools by instilling in our children a hearty distaste for knowledge, when so little imagination could translate almost any subject into a challenge to curiosity. And we carry the deadly tradition on into the field of adult books, and wonder why people, no longer under compulsion to read, prefer ignorance to tedium. Happily this condition is changing. Men eminent in research and scholarship have been found who write dramatically and invitingly of science, of history, even of economics. But the time has not yet come when in every publishing house a book of serious import must pass the two-fold test of accurate scholarship and of interest.—

*Publishers' Weekly*, New York. Oct. 15, 1932. E. G. R.

## PERSONALS

DR. E. R. SHAFFER, F.A.P.H.A., has been appointed Chief of the Bureau of Child Hygiene of the Ohio State Department of Health.

RAY H. EVERETT, F.A.P.H.A., was elected Executive Secretary of the District of Columbia Social Hygiene Society, assuming office on November 15.

MRS. HUGH BRADFORD, of Sacramento, Calif., will represent the National Congress of Parents and Teachers at the World Federation Conference, to be held in Dublin, Ireland, July 29–August 4, 1933.

DR. IRA O. CHURCH, member A.P.H.A., Health Officer of Contra Costa County, Calif., has been appointed assistant medical director of Alameda County under an emergency ordinance recently passed.

DR. FRED P. HELM, formerly of Miami, Okla., has been appointed Health Officer of Topeka, Kans., succeeding Dr. Aurel Goodwin, who resigned.

DR. TILLMAN C. BRITT, member A.P.H.A., of Washington, N. C., has been appointed Health Officer of Surry County, to succeed Dr. Malcolm T. Foster, Mount Airy, on leave of absence.

## DEATHS

DR. CALVIN L. COOPER, member A.P.H.A., and Kansas City, Mo., Health Director, died December 1.

EDITH VIVIAN EVANS, Director of the Occupational Therapy Department of the Neurological Institute of New York at the Medical Centre, and President of the New York State Association of Occupational Therapy, died November 27.

## CONFERENCES

January 16–18, Fifteenth Annual Water Works Short School, Temple, Tex.

January 17, New York State Sewage Water Works Association, New York, N. Y.

February 6–10, American College of Physicians, Seventeenth Annual Clinical Session, Montreal.

April, American Physiological Society, Cincinnati, Ohio.

July 1–7, National Education Association, Chicago, Ill.

July 29–August 4, World Federation of Education Associations, Dublin, Ireland.

**Kellogg's**  
**ALL-BRAN**  
RELIEVES  
CONSTIPATION

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

February, 1933

Number 2

## Aerial Nuisances from the Refining and Burning of Petroleum Oils\*

STEPHEN DEM. GAGE, F.A.P.H.A.

*Consulting Sanitary Engineer, Providence, R. I.*

THE question of whether pollution of outdoor air by offensive odors should be considered a public health matter has occasioned more or less difference of opinion in the past. Most health officials have inclined to the opinion that while such odors might be offensive and thereby constitute a nuisance, they do not directly cause disease, and therefore cannot be considered as affecting the public health. There is, however, a somewhat different interpretation which may be placed on the terms "health" and "odor." An odor considered purely in its olfactory sense as something which may be smelled, may not cause specific and lasting disease although it may be offensive. Nevertheless, such an odor may be so repulsive to certain persons as to cause reflex action of the nervous and muscular systems leading to digestive and other systemic disturbance which will seriously interfere with regular performance of ordinary duties. Frequently repeated, such disturbances may also readily affect the general health of the individual, causing a lowered vitality and a decreased resistance to disease.

Many substances which affect the olfactory senses are direct poisons, or cause irritation of the mucous surfaces, rendering them more susceptible to infection. On the other hand, certain gaseous substances, such as carbon monoxide, are direct poisons, although they are entirely odorless. The first produce reactions which may be termed psychological, while the others produce a true physiological reaction. There is, however, no sharp line of demarcation between

---

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.



these two classes of reactions nor between the aerial conveyed bodies which produce them. Odors arising from so-called nuisances are frequently made up of a mixture of gases and finely divided particles of solid or liquid matters in suspension, the effect of the odor being the combined effect of its components, which may set up both sets of reactions simultaneously.

The sense of smell and the reaction to different odors or irritants varies widely in different persons. A concentration of odor which might pass unnoticed by the majority might be disagreeable to a considerable number, and extremely offensive and irritating to a comparatively few; yet these few may suffer severely if the visitation of this particular odor is frequent or long continued. Because the olfactory sense in such persons is more highly developed is no reason why they should be termed cranks or neurotics. Public health in a broad sense must include the few as well as the many.

By reducing or eliminating atmospheric pollution by offensive odors we may be building better than we know. In the days when water purification was in its infancy health authorities were much surprised to find that by bringing purified water into typhoid ridden communities not only was the death rate from water-borne disease reduced but there was also a marked falling off in the death rate from other diseases. This effect is known as the Mills-Reinke phenomenon. If such a striking phenomenon followed a clean-up of the public water supplies, may we not expect some similar phenomenon to result from a clean-up of public air supplies. Under such a premise the abatement of offensive odor nuisances and the correction of atmospheric pollution becomes a proper field for extended activity by the public health engineer.

As a rule, cases of atmospheric pollution affect a relatively small area, and the number of people exposed is so small that the real health hazard, if any, cannot be studied to advantage. Perhaps it is for this reason that so little authentic information is available as to the effect on health of the pollution of outdoor air by offensive odors.

#### THE PROVIDENCE ODOR INVESTIGATION

In Rhode Island the power to abate nuisances is vested entirely in the municipal authorities, and the State Health Department acts only in an advisory capacity, and on the request of local authorities. In 1919, however, complaints that public health was being jeopardized by an odor nuisance in the Providence Metropolitan area became so numerous and so widespread that the General Assembly at its 1920 session ordered an investigation by the State Board of Health. In

this investigation, which was conducted by the writer, we endeavored to cover 3 principal points: (1) The origin of the odors and the cause thereof. (2) The degree of magnitude of the nuisance, that is, the frequency and duration of the odor manifestations, the intensity of the odor at different times and at different places, and the area and population affected. (3) The effect, if any, of the odors upon the health of persons residing in the affected areas.

Interesting as they may be, time does not permit me to discuss the methods and results of this investigation, except in so far as they are related to the public health phase of the problem.

Although it was at first believed that the nuisance was originating from 2 plants, 1 engaged in the refining of crude petroleum and the other in the manufacture of asphalt from petroleum, it developed that odor nuisances affecting the same general territory were originating from at least 4 large oil burning power plants—a gas works, a plant manufacturing road binders and other products from gas tar, a plant manufacturing ammonia from gas liquors, and a slaughter house and rendering establishment. In addition, oil burning installations for heating a number of office buildings and commercial establishments, and a considerable number of private homes were believed to be contributing to the nuisance. In a study of the public health phase of the problem, therefore, we had to take into consideration not only the possible effect of the volatile constituents arising from the breakdown of crude petroleum under distillation, but also the effect of gases, etc., produced by more or less complete combustion of petroleum oils, and the effect of substances given off from the other industrial processes noted.

The total area subject to the effect of these odors was about 23 square miles with a resident population of over 126,000. In one of the 3 districts into which this area was divided for study, an offensive odor nuisance was recorded on 112 of the 158 days this district was under observation. In the other 2 districts, odor nuisances were recorded on 75 out of 121 days, and on 57 out of 148 days respectively.

We attempted to obtain data as to the public health phase of this problem by two methods: By employing a qualified physician, who had had experience in industrial hygiene, to make a special inquiry among persons who claimed their health was being affected by the odors; and by a letter of inquiry, or questionnaire, sent to all practicing physicians in the state, requesting full information as to patients under their care who had apparently been made ill by the odors, or whose illness from other causes was being aggravated by the odors. The physicians were also asked to express their opinion as to the

effect of offensive odors in general, and certain volatile or gaseous substances in particular, upon both normal persons and persons who were suffering from certain diseases.

HEALTH SURVEY IN ODOR AFFECTED AREA

In our direct investigation among the residents of the odor affected districts it was impossible because of lack of funds to make a house-to-house canvass to obtain full and complete statistics. However, it was possible to interview something like 300 different persons, mostly complainants, scattered throughout these districts, and to obtain from them complete data as to the effect of the odors upon various members of their families. This inquiry therefore covered a representative population of about 1,000 to 1,200, among whom were found 89 who were being made ill by the odors, or whose illness from other causes was being aggravated by the odors. To this number may be added 7 additional cases reported by physicians, making a total of 96 cases of which we were able to obtain a complete history. Seventy-five were females and 21 males. It might be stated that in my experience women and children appear to be more susceptible to obnoxious odors than are men. The large preponderance of women in this particular case, however, may have been due in part to the fact that visits were made only in the daytime and a large proportion of the persons interviewed were women.

The most common symptoms complained of were irritation of the throat, suffocation or choking sensation, nausea, headache, dizziness, and malaise. Twenty-four persons stated that the odors would wake them from a sound sleep. Seventy-seven persons exhibited two or more symptoms, 46 gave a history of three or more symptoms, and 14 a history of four or more symptoms.

In a considerable number of cases, those affected would be awakened by a suffocating or choking sensation, which would be followed by nausea. A number of persons complained of a dizziness so marked that they were unable to get up to shut the windows. In quite a large

TABLE I

<i>Symptom</i>	<i>Number of Persons</i>
Nausea . . . . .	56
Headache . . . . .	44
Irritation of throat.....	42
Suffocation . . . . .	27
Malaise . . . . .	25
Dizziness . . . . .	22
Choking sensation . . . . .	13
Irritation of nose.....	5
Irritation of eyes.....	2
Gastric trouble . . . . .	2

proportion of cases it was stated that the nausea, dizziness, and headache persisted into the following day, many hours after the odors had ceased to be noticeable. The number of persons exhibiting the various symptoms is given in Table I.

#### OPINIONS OF PHYSICIANS

In the letter inquiry among practicing physicians, about 725 questionnaires were sent out, and 190 replies were received. Ten physicians reported data on 32 patients who were being affected by the odors, 7 of whom had not been picked up in our canvass of complainants. The symptoms reported are shown in Table II.

TABLE II

<i>Symptom</i>	<i>Number of Persons</i>
Headache, cyanosis, pains in chest and abdomen...	10
Nausea and vomiting.....	6
Nausea and malaise.....	6
Nausea, headache and insomnia.....	3
Nausea, suffocation and sore throat.....	3
Headache and suffocation.....	2
Nausea, headache, insomnia and suffocation.....	1
Nausea, headache and loss of appetite.....	1

Nine physicians also reported having 15 patients ill with other diseases whose condition was being unfavorably affected by exposure to the odors. The types of cases reported included pulmonary tuberculosis, asthma, pharyngitis, laryngitis, cardiac trouble, and nervous diseases.

The opinions of this group of physicians as to the effect of certain volatile and gaseous constituents probably present in the air of the affected districts is interesting as showing the trend of medical opinion at the time. Between 120 and 150 physicians replied to our various questions relating to this point, the majority of opinions being that air polluted by the volatile constituents of petroleum, by sulphides, or by sulphur dioxide, might affect the health of normal persons, and would certainly affect unfavorably the health of persons suffering from respiratory or nervous diseases or from asthma.

#### CONCLUSIONS

If we compare the list of symptoms produced in the 96 persons recorded as being made ill by odors with the symptoms which are known to be produced by the volatile and gaseous constituents which escape into the air in the distillation of crude petroleum, or from the stacks of plants using oil as fuel, we find that they are practically identical.

It is well recognized that the vapors and gases from the process of distillation of crude petroleum may produce both acute and chronic symptoms. Benzene, for example, in the proportion of 50 p.p.m. in air is extremely poisonous and in a concentration of 20 p.p.m. produces local symptoms. The still gases from

refineries handling high sulphur oils contain sulphides, either as organic sulphides or as hydrogen sulphide, and also probably carbon bisulphide, all of which are highly poisonous and produce symptomatic disturbances when diluted with considerable volumes of air. During combustion these sulphides are converted to sulphur dioxide and in some cases to sulphur trioxide, both of which affect the respiratory and digestive systems. With incomplete combustion, such as was frequently observed in our study of oil burning plants, carbon monoxide may be given off in considerable quantities.

The chain of circumstantial evidence seems to be complete that the illness of 96 persons was caused by atmospheric pollution arising from destructive distillation of high sulphur petroleum or from the use of such petroleum oils in large quantities for fuel.

Owing to the closure of the Mexican oil fields by revolutionary disturbances, the petroleum brought to Rhode Island for refining and for use as fuel in recent years has been of relatively low sulphur content. While the writer has occasionally noted odors in these formerly odor-ridden districts, their frequency and intensity have been very largely reduced, and complaints from residents have practically ceased. Nevertheless, while the atmospheric pollution by odoriferous and irritating sulphur compounds has been greatly reduced, they must still be present in small amounts, and there can have been no material reduction in the pollution by non-odorous volatile petroleum constituents. It would be interesting if a resurvey of this district could be made to determine whether former complainants had been cured of their ailments, or they had merely stopped complaining because they could not smell the atmospheric pollution which must still exist in greater or less measure.

## DISCUSSION

EDWARD WRIGHT

*Sanitary Engineer, Massachusetts Department of Public Health, Boston, Mass.*

THE discussor has read the paper on "Aerial Nuisance from Refining and Burning of Petroleum Oils" and does not feel competent to discuss intelligently the effect of such odors on the public health. This he feels is a medical, physiological, or psychological problem requiring more the attention of a physician than an engineer. Neither is the writer able to discuss intelligently the interesting question raised by Mr. Gage of a possible application of the principle of the Mills-Reinke phenomenon in connection with the control of industrial odors, but he feels that this is something to be hoped for.

So far as major nuisances are concerned in Massachusetts, however, the statutes link comfort with public health, and the writer has had considerable to do with the determination of the extent of such nuisances and their correction. There is little doubt of the effect of certain offensive industrial odors, at times at least, on the public comfort, and it can perhaps sometimes be shown that offensive industrial odors have an effect upon persons suffering from nervous disorders.

It must be pointed out that the workmen in industrial plants are generally well endowed with health. Probably the fairest way to determine the effect of industrial odors on public health is to study the returns on the cases of respiratory diseases in a community subject to industrial odors and make a comparison with the returns from other industrial communities not subject to offensive odors. The

writer believes that the results of certain industrial odors have more of an effect upon the public comfort than those arising from the pollution of streams, and feels that this problem of the control of industrial odors is much more in the public mind, and is likely to continue so, than is the problem of stream pollution purely from a nuisance standpoint.

Some 13 years ago 3 sizeable oil refineries were established in Massachusetts and engaged in the refining of crude oil obtained largely from Mexican fields. This contained large quantities of sulphur, and the escape of sulphuretted hydrogen during processing was a particularly disturbing factor to the residents in the vicinity. In fact, in one instance the odors were known to affect a considerable portion of the Boston Metropolitan District for a distance of 8 to 10 miles. After many minor remedies were made at a cost of several thousands of dollars, it still appeared impossible to control the situation, and the matter was brought into court resulting in a verdict against the company. The court ordered the company to install numerous additional odor elimination devices, but about this time there was a change in the crude oil market, and the company was reorganized. The crudes were changed to those containing less sulphur, and there has since been little complaint.

The writer also investigated for the Massachusetts Department of Public Health in 1922 another large oil refining establishment. Odor control devices and careful policing resulted in a temporary relief from offensive odors, but nevertheless the matter was brought before the courts, and there is an interesting decision in *Strachan and others vs. Beacon Oil Company* (see 251 Mass. 479). This went through the Supreme Court of Massachusetts with a finding decidedly in favor of the company. The following is quoted from the decision:

" . . . The defendant is engaged in a lawful business in the conduct of which it is found that odors necessarily will escape into the air; but it also appears that the defendant has adopted the most approved methods and devices to control and confine such odors at an expense of many thousands of dollars; it also is further found that such odors would not be unbearable or injurious to the health of normal persons. . . . Whether there is a nuisance in a certain locality depends upon the attendant circumstances including the character of the neighborhood, the acts complained of, and their effect upon the comfort or health of people in general. The district where the defendant's plant is situated has for many years been increasingly devoted to manufacturing purposes; some of the plants were there located many years ago and from some of them odors are thrown off at times which are offensive and disagreeable, but as those discharged by the defendant are not injurious to the lives or health of normal persons, it cannot be held that a nuisance exists in view of the findings of the master to the contrary.

"It is a matter of common knowledge that in thickly settled manufacturing communities, the atmosphere is inevitably impregnated with disagreeable odors and impurities. This is one of the annoyances and inconveniences which every one in such a neighborhood must endure. Mere discomfort caused by such conditions without injury to life or health cannot be ruled as matter of law to constitute a nuisance. Each case must depend upon its own facts and no rule can be formulated which will be applicable to all cases. *Rogers v. Elliott*, 146 Mass. 349. *Downing v. Elliott*, 182 Mass. 28. *Stevens v. Rockport Granite Co.*, supra. . . ."

The area in which this industry is located is one of the most intensively developed industrial districts in New England. Complaints continued to come

in, and the Legislature of 1932 passed a resolve, Chapter 40, providing for an investigation by the Department of Public Health. This resolve is in part as follows:

"Resolved, That the department of public health is hereby authorized and directed to investigate the causes of offensive odors, fumes and gases emanating from industrial processes and other sources in the cities of Everett and Chelsea and to determine the effect, if any, of such odors, fumes and gases upon the public health and comfort. For the purposes of this resolve, said department may enter the premises of any person or corporation in the said territory, shall have access to such records and plans relating to odor elimination devices as are on file in the offices of the various corporations therein, and may employ such engineering and other assistance as may be necessary.

"Said department shall report to the general court its findings and its recommendations, if any, together with drafts of legislation necessary for carrying such recommendations into effect. . . ."

An appropriation of \$5,000 was made and the investigation is now well under way. It is inadvisable, of course, to report at present the results or the determination of the department as to the effect of the odors, if any, upon the public health and comfort, as the work has not been completed. The investigation is to include a study of the reported cases of respiratory diseases.

The district includes a large oil refinery, a large chemical works, gas works, varnish plants, etc. The investigation has shown that sulphur compounds of various kinds originate in certain processes and that one of the particularly offensive odors from the refining of oils is of the mercaptan group, frequently referred to by complainants as an onion or garlic odor.

An adaptation of the Palmer dust apparatus has been used in this investigation as in the earlier ones for the determination of  $\text{SO}_2$  in the air.

The investigation has indicated that probably one of the most offensive sources of nuisance to contend with in this region is that due to the disposal of acid sludge which is a result of treating crude gasoline with acid for the removal of impurities. This material after treatment is used for fuel purposes, and it is hoped that the study will show a suitable method of disposal. Another source of odor observed is that due to the disposal of large quantities of liquid wastes containing offensive oily substances, and samples of some of these wastes, even when diluted 1 part in 100 million parts of air by volume in the laboratory, have given off perceptible odors. The life of certain pipe lines used for conveying hot oils, gases, and other substances, in certain processes in these industries is very short, and frequent replacements are required in the pipe lines and valves at intervals of 6 months to a year. In recent years an improvement has been made in these pipes by using steel with a larger chromium content, the material being known to the trade as "Enduro." This investigation has indicated not only the necessity of odor control devices but the careful policing of the industries if the conditions complained of are to be corrected.

This whole matter of the detection and elimination of industrial odors and the effect on health was the subject of a symposium before the American Society of Civil Engineers in 1925 which can be found in their *Transactions*, Vol. 89, 1926, p. 339, and while there have been changes and improvements this symposium is perhaps the most comprehensive of any similar series of papers available.

# The Bacteriology of the Intestinal Pathogens\*

LEON C. HAVENS, M.D., F.A.P.H.A.

*Laboratories of State Board of Health, Montgomery, Ala.*

THE isolation and identification of pathogenic bacteria from the intestinal tract is one of the most difficult bacteriological problems which confront a public health laboratory. Their isolation, on the one hand, is attended by many technical pitfalls, and, on the other, the administrative control of this important group of diseases rests largely on the results obtained in the laboratory. Any significant organisms which may be found require intelligent and careful work for their identification. The technical difficulties involved require special training and experience; a thorough knowledge of bacteriological methods and principles is necessary for accurate results. There seems at present no way for the inexperienced worker to acquire this knowledge except through actual experience, and often at the expense of serious error. One is impressed, in studying the available treatises on diagnostic methods, by the casual manner in which the bacteriology of the intestinal infections has been handled. Perhaps the chief reason for this is the very lack of uniformity in methods, and their multiplicity, but the result is that many clinical laboratories, as well as some of the smaller public health laboratories, make little attempt to interest themselves in the practical applications of bacteriologic methods in the diagnosis of this group of infections.

The subject falls into 3 divisions: (1) preservation of the specimen; (2) methods for isolation, and (3) identification of significant organisms. Each of these is important, but the preservation and isolation usually present the greatest difficulties. Many special media have been described, particularly for the isolation of the typhoid group, while the preservation of feces for bacteriological study has not received the attention which it seems to deserve. Almost every bacteriologist has his favorite procedures which are more or less successful in his own hands; consequently, he hesitates to accept new methods or modifications of old ones.

---

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.



Even when the isolation procedures can be started promptly with the freshly-passed stool, some means of preserving the specimen for further study are desirable, because it has been our experience that repeated platings materially increase the number of positive results. In most public health laboratories considerable time is bound to elapse between the collection of the specimen and its arrival at the laboratory, and this delay makes some good preservative medium the first essential of a reliable examination.

After one is assured of a properly preserved specimen, the successful isolation of any pathogen which may be present is determined not only by the media used but also by the care with which the plates are streaked. The well-nigh universal practice of permitting this important step to rest upon a single plate or series of plates prepared at the same time is comparable to reporting a blood culture negative after only 24 hours' incubation. A good preservative medium permits survival of *B. typhosus* and related organisms for several days, with a progressive diminution of the fecal flora. When the original number of typhoid bacilli is small, colonies will frequently appear on plates streaked the second or third day, after further decrease of the fecal bacteria has occurred.

Furthermore, a plating medium which has a sharp selective action will permit the development of typhoid colonies, when another, which is less effective in inhibiting the colon group, will give entirely negative results. Our own observations indicate that *B. typhosus* survives a long time in feces; it is not so much its early death which causes negative results as the enormous overgrowth of *B. coli* which prevents the appearance of the typhoid colonies on the plates.

The identification of members of the typhoid-paratyphoid group, in the hands of competent bacteriologists, usually offers no difficulties. Dissociative changes may sometimes make a particular strain atypical in certain respects, but the sum total of a thorough cultural study, together with the serological reactions, usually makes the identification certain. There should surely be no excuse for confusing *B. proteus* with *B. typhosus*, nor should a strain of *B. coli* merely because it happens to ferment lactose slowly, be mistaken for a dysentery bacillus. Everyone who has had extended experience with fecal bacteriology, has found numerous unclassifiable bacteria which sufficiently resemble the established pathogenic types to cause at least momentary confusion. Some of these differ culturally only in their reaction on a single carbohydrate; but, serologically, they cannot be brought into relationship with any known species. On the other hand, some strains show such overlapping, both in cultural and serologic characteristics

as to make classification difficult, if not impossible. Whether these organisms are variants of known types, and whether they are even pathogenic, there is no evidence on which to base an opinion, but their chief bacteriological importance seems to lie in their confusing resemblance to known pathogens, with the consequent necessity for their differentiation in arriving at the etiologic agent in any given case.

In addition to these technical phases of the subject there are field problems of prime importance to a thorough and intelligent understanding of the mode of spread of the enteric diseases. The significance of the healthy carrier in the causation of outbreaks, the geographic distribution of carriers, the relation of subclinical infections to the carrier condition, are questions which require close coöperation between the epidemiologist and the bacteriologist for the most effective solution. The antigenic relationships in the dysentery and Salmonella groups and the practical significance of the different antigenic components of these bacteria are other problems which await additional knowledge before their full epidemiologic applications can be intelligently evaluated.

Public health laboratories are depended upon for by far the larger portion of intestinal bacteriology. Carrier surveys must often be made on an extensive scale, and convalescent cultures must be dependable. Upon the results of the laboratory rests the effective control of the enteric infections. I know of no service which the Committee on Standard Methods of this section could render which would be of more value, particularly to the small laboratory, than to create some degree of order out of the technical chaos which now exists. It is essential that the results of official laboratories be comparable. The need, therefore, for special study of bacteriologic procedure, and group judgment as to the best methods for official examinations, especially of typhoid carriers and convalescent cultures, is urgent.

This is not the place to discuss technical details, but it seems to me that a study of the various phases of the subject could do much to clarify the situation, even if full agreement were not reached with regard to all procedures. The thorough-going investigation of complement fixation in syphilis which Dr. Ruth Gilbert has made as referee for the committee, while it has not evolved a technic which is acceptable in every detail to all laboratories, did serve a very important purpose in emphasizing some of the current technical faults, and undoubtedly resulted in a general improvement in methods and results.

A similar approach might be made to the subject of the intestinal pathogens. Criteria could be established for minimum acceptability which would probably receive practically universal agreement by the

larger laboratories and be very helpful to smaller ones which are handicapped by lack of extensive material on which to base their judgments and interpretations.

These minimum requirements, it seems to me, should include general specifications for satisfactory preservative media, the use of selective media for isolation and acceptable procedures for identification, including the essentials for classification, both cultural and serological. Reasonable standards covering these phases of technic should meet little difficulty in gaining acceptance and should increase the effectiveness of many laboratories in this particular field.

---

## Anthony van Leeuwenhoek

THE year 1932 was the 300th anniversary of the birth of Van Leeuwenhoek. Although a drygoods merchant devoid of medical training, he became interested in facts concerning the body, and made a communication to the Royal Society of London in 1673 concerning the blood, in which he states that he had oftentimes wondered of what parts it consisted. Finally he took blood out of his own hand and found "small, round globuls driven through a Crystalline humidity or water." He doubted that all blood was like this and noticed that in the small amounts examined, color was practically absent. This communication is said "to have shaken that august body to its foundations."

We remember him, however, chiefly on account of his improvement in the microscope. Up to his time, the highest magnification had been from 25 to 30 times, while van Leeuwenhoek was able to increase this to from 80 to 270 times. He is said to have owned 247 microscopes and 419 lenses, most of which he ground himself. He was the first to describe spermatozoa; he discovered the striations in voluntary muscle; the structure of the crystalline lens; demonstrated anew the capillary anastomoses between arteries and veins; described what is called animalculae in water in 1675; found microorganisms about the teeth, and was the first to draw bacterial chains, clumps, rods and spirilla. One of his communications was made to the Philosophical Society of London in 1675. He was elected F.R.S.

His death took place in 1723 at the age of 91. He is buried in the Old Church at Delft, and the epitaph on his monument ends with the following words: "As everybody, O Wanderer, has respect for old age and wonderful parts, tread this spot with respect; here grey science lies buried with Leeuwenhoek."—Abstract, *Canad. M. A. J.*, Nov., 1932.

# Maternal Mortality Study for Cleveland, Ohio\*

RICHARD A. BOLT, M.D., DR.P.H., F.A.P.H.A.

*Director of Cleveland Child Health Association, Cleveland, O.*

A COMPLETE and detailed study has been attempted of every puerperal death occurring within the confines of the City of Cleveland during 1931. This includes the deaths of women from all causes dependent more or less directly upon pregnancy at any stage of gestation and upon parturition. It requires a careful scrutiny of every death recorded as puerperal by the local Bureau of Vital Statistics of the City Division of Health. It includes so-called "Criminal Abortions," which are usually classified as homicides. These are as truly puerperal as those following self-induced or therapeutic abortions, and they should be included in any complete study of puerperal mortality. Every coroner's case involving the puerperal state has been investigated thoroughly. The deaths of all females between the ages of 15 and 50 years also have been checked against the live births and stillbirths. Every association between them, suggested by similarity of name, place of residence or of birth, and time of birth, has been followed up to determine possible puerperal relationships. The official number of puerperal deaths in Cleveland during 1931 was 117. This study revealed 151 puerperal deaths, including the 12 criminal abortions, which could be so classified.

Basic data in addition have been secured from individual physicians, midwives, hospital records, and the Visiting Nurse Association. The items have been recorded on schedules prepared by an advisory committee of the U. S. Children's Bureau. They have been analyzed in the office of the Cleveland Child Health Association. This study was undertaken with the approval of the Academy of Medicine of Cleveland and was made possible by the thorough coöperation of the Cleveland Division of Health, individual physicians, maternity and general hospitals, coroner's office, and the Visiting Nurse Association.

---

\* Summary of paper read before the Child Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932. The complete paper with tables and charts will be published elsewhere.

During 1931 there were 16,279 live births and 592 stillbirths. Of those born alive, 496 died under 2 weeks of age and 527 under 1 month. There were 151 puerperal deaths, giving a puerperal mortality rate of 9.3 per 1,000 live births or 8.9 per 1,000 live births and stillbirths. The official puerperal mortality rate based upon 117 recorded deaths was 7.2 per 1,000 live births.

It is highly desirable that a distinction be made between viable births, which may be expected to survive, and those which have little possibility of living. In this study there were puerperal deaths following 50 abortions, 8 ruptured ectopics, and 7 undelivered, all under 28 weeks of uterogestation, and 2 undelivered over 28 weeks. This leaves only 84 viable births. A maternal mortality rate based on this number would be 5.2 per 1,000 live births. Thus it is seen that after removing all abortion deaths there remains a fairly high maternal mortality rate.

In this study every fetus under 28 weeks of gestation is considered as non-viable and its premature expulsion is classified as an abortion. Of the 50 puerperal deaths following abortion 16 were spontaneous, 14 self-induced, 12 criminal, 6 therapeutic, and 2 of unknown origin. The primary causes of death following these abortions were sepsis alone in 35 cases, hemorrhage alone in 7, sepsis with hemorrhage in 2, and 1 case each of embolism, lung abscess, myocarditis, toxemia, intestinal obstruction, and pulmonary tuberculosis. Abortions, therefore, make up one-third of the total puerperal deaths. In over 70 per cent of these abortions sepsis was the primary cause of death. In 42 of the abortion cases there was no prenatal care, in 5 the care was inadequate, and in only 3 could it be considered adequate. Following 31 of the abortions some operative procedures were instituted. In very few of the abortions was it possible to secure any prenatal care. It is misleading, therefore, to make any comparison of maternal mortality in the community at large, where all deaths from abortions are included, with the mortality among maternity cases under intensive care after the middle of pregnancy.

Abortion undoubtedly has been on the increase since the World War. This condition may be one of the main factors in the stationary or increasing puerperal mortality rates in this country. It can be shown from other data that it is fallacious to compare maternal mortality rates in the United States with those in other countries, where definition of terms, methods of classification, and interpretation of records differ widely. Even in the Cleveland study 33 puerperal deaths of the 151 were subject to diagnoses or interpretations different from those recorded in the original death certificates.

Of the 1,679 registered physicians in Cleveland, 853 attended one or more of 16,005 live and stillbirths during 1931, or 95 per cent of the total births. About one-sixth of the physicians had over 20 confinements. The majority had 5 or less during the year; 80 physicians listed as obstetricians and gynecologists attended approximately 34 per cent of the births, 773 general practitioners 61 per cent, and midwives 5 per cent. Nine osteopaths handled 27 obstetrical cases during 1931.

The 151 puerperal deaths occurred in the practice of 109 physicians and 9 midwives. Fifty-five of these occurred in the practice of 33 physicians listed as obstetricians and gynecologists, 87 in the practice of 76 general practitioners, and 9 in the hands of 9 midwives. In other words, 36 per cent of the maternal deaths were handled by specialists, 58 per cent by general practitioners, and 6 per cent by midwives.

Approximately 60 per cent of the total live and stillbirths (10,115 confinements) occurred in 31 hospitals; 85 per cent of the puerperal deaths occurred in these same hospitals. The maternal mortality rates varied greatly depending upon the nature of the hospital, composition of staff, and selection of cases. The exclusively maternity hospitals showed the lowest rates (combined rate 5.9 per 1,000 live births) as contrasted with the general hospitals with maternity licenses (rate 14.4). If comparison be made on the basis of viable births only the rates in the maternity and general hospitals closely approach one another. The city hospital, however, to which all types of cases are referred, had an exceptionally high mortality. The puerperal mortality rate for the 6,756 home cases was 3.5 per 1,000 live births as compared with 13.1 in the hospitals as a whole. It should be noted, however, that practically all the deaths following abortion and many of the complicated deliveries occurred in the hospitals. However, if all abortion deaths are eliminated, the hospital rate still remains considerably higher than that in the homes.

There were 98 registered midwives in Cleveland in 1931. Of these 87 attended 811 live births and 9 stillbirths. Nine puerperal deaths occurred among cases with which the midwife had anything to do. Every puerperal death in which a midwife contact could be traced was credited to the midwife and not to the doctor signing the death certificate. Five of the 9 puerperal deaths followed criminal abortions induced by midwives and later turned over to physicians. All of these died of sepsis. One midwife's case with a difficult impacted shoulder was delivered by a physician and died of sepsis. Three deaths occurred suddenly, apparently from emboli, on the 3rd, 8th, and 36th

day after normal deliveries. If we exclude the abortion deaths, we find that the puerperal mortality rate among viable cases in midwives' practice (5.0) is still lower than that among physicians' cases (6.3 per 1,000 live births).

The primary causes of death among the 84 women giving birth to viable fetuses were as follows: puerperal septicemia 19; various accidents of labor including cesarean section, instrumentation, surgical interference, version, etc., 18; toxemias of pregnancy 12; puerperal hemorrhage 8; emboli 8; other accidents of pregnancy 6; lobar pneumonia 4; pulmonary tuberculosis 2; puerperal psychosis 2; and 1 death each from scarlet fever, influenza, cerebrospinal meningitis, chronic nephritis, and anesthetic shock. One of the undelivered cases died of bronchopneumonia, and the other was an anesthetic death.

As contributing or secondary causes, accidents of labor took first place with 21 cases, pneumonia came second with 15 cases, and diseases of the heart third with 14 cases. It is seen, therefore, that while a number of different conditions may play a secondary or contributing part, the puerperal state itself was mainly responsible for the deaths, with sepsis as the leading cause and accidents of labor and toxemias as close seconds.

There were 12 deaths following classical cesarean section, and 4 following cervical section. Eight deaths followed internal podalic version and extraction, and 7 followed breech extraction. The number of deaths, following forceps delivery were as follows: "prophylactic forceps" 4, low forceps 16, mid-forceps 3, and high forceps 1, a total of 24 forceps deliveries. In 28 cases only were the deliveries spontaneous.

Other analyses from the basic data will bring out factors relating to age distribution and parity, length of time attended by physician, adequacy of prenatal care, birthplace, marital status, and occupation. It also will be possible, with the aid of data assembled by Howard Whipple Green, to indicate distribution of births, puerperal deaths, stillbirths, and deaths under 1 month, in economic areas comprised of census tracts having equivalent monthly rental values.

#### CONCLUSIONS

1. Factors entering into puerperal mortality are so interwoven with the social, economic, and cultural fabric of the community that it is impossible to evaluate them without a detailed study of each individual case.

2. Comparison of maternal mortality rates for different communities is misleading unless definition of terms, methods of collecting data, and interpretation of records are comparable.

3. Deaths following abortion should be separated from deaths after the 28th week of uterogestation to gain a true picture of the situation.

4. The midwife, aside from abortions, plays a relatively minor rôle in contributing to the high maternal mortality rate.

5. Sepsis, toxemias and hemorrhage play the major tragic rôles, and these are associated largely with hurried, operative, and bizarre obstetrics.

6. Prenatal care and hospitalization are accessories to the actual obstetric situation. They may or may not be associated with a low maternal mortality, depending upon the type of medical, nursing, and hospital care afforded.

7. Not every maternal death is, at present, preventable. Fundamental changes must take place in the socio-economic order and more complete medical knowledge and skill be available in order to approach this ideal.

---

## Bovine Tuberculosis

JENSEN asks, "Is bovine infection in man so extensive and the cause of so much serious disease that more effective measures against it than those already in force are needed?"

For 9 years he has isolated and typed tubercle bacilli from various tuberculous lesions. Some 400 cultures have been studied with the following results: 37 cases of pleural effusion, 36 bovine, 1 human; urino-genital, 16 cases, 13 human, 3 bovine; cerebrospinal fluid, ratio of human to the bovine type, 34 to 11; cervical glands, 23 cases human, 31 bovine. Other forms of surgical tuberculosis, 68 human, 5 bovine. He finds that tuberculosis of the glands of the neck traceable to the bovine type is at least as frequent as the human in Copenhagen as in the provinces. He answers his own question emphatically in the affirmative.—Abstr. by C. Lillingston in *Bull. Hyg.*, Nov., 1932, p. 710.



# Motivation in Health Education\*

BENJAMIN C. GRUENBERG

*New York, N. Y.*

HEALTH education we may take to mean the sum of all efforts to modify human conduct and attitudes so as to raise the health level of individuals or of the community. It includes the education of the diabetic or of the tuberculous in his personal regimen, propaganda for immunizing children against diphtheria or smallpox, and the promotion of sales of cod liver oil or tooth pastes. In such education the most frequent appeal in the past has been to fear. If you eat green apples you will get the gripes. If you don't brush your teeth the goblins will get you. Horrible pictures of smallpox victims, horrible statistics of deaths from preventable diseases, horrible reminders of aches and pains, horrible portraits of rickety children—horrible devices of various sorts to arouse horror.

We could make out a good case for the appeal to fear on strictly logical grounds. We can still hear the reverberating echoes of the solemn dictum that "self-preservation is the first law of nature," even if we are not exactly clear as to what it means; and with that first law as a major premise we can rationalize taking the easier way of trying to scare people into being healthy. But that would hardly be a demonstration of the effectiveness of the technic. Of course, people are influenced by fear; of course a burned child dreads the fire; but we still have to answer the question—How can we most effectively influence people's conduct in the direction of maintaining or of improving their health?

To demonstrate the effectiveness of the appeal to fear we can point to the thousands who no longer shake the hands of those they meet, who never kiss those they love, who polish the tableware in hotels and restaurants with their napkins, and who shield their babies not only from the evil eye but from the false lips of lady friends and politicians. We can also point to the entire armies that boil all the water they take internally, as well as to entire counties or larger governmental units in which the inhabitants always close their windows at night to avoid malaria—a practice which is said to account for the salubrious atmos-

---

\* Read before the Public Health Education Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

phere of country districts. Granting that the various practices and avoidances are desirable in the interests of health, it is still questionable whether they can be best established at the risk of cultivating phobias and hypochondrias. We can learn to sterilize water or wipe our soup-spoons in public places as standard practice without encouraging the imagination to dwell upon the frightful possibilities of neglect; just as we can establish routine vaccinations and routine Wassermanns without making the flesh creep.

A state of panic is itself undesirable, from a health point of view. Moreover, it interferes with our purposes when considerations of health demand the doing of something rather than the avoidance of dangers—as for example, taking exercise, maintaining erect posture, breathing deeply, chewing thoroughly. We may learn from the manufacturers of soaps and antiseptics and tooth brushes, who have at stake large capital investments and other overhead expenses, and who presumably are searching for the most economical uses of their advertising appropriations—these people have been redirecting the attention of their prospects from the danger of losing teeth or of having them ache, to the satisfactions of handsome teeth or lasting teeth, for example. They have shifted the emphasis from the fear of repelling potential admirers of the opposite sex through body odors or foul breath to the satisfaction that may ensue from making oneself attractive.

It is perhaps significant that when the reliance upon fear in health education was questioned or criticised, the only positive motivations that we could think of were those related to competitive self-aggrandizement. For many years the only alternative to the horrible examples offered young people as inducements to sobriety were in the form of keeping fit campaigns; and keeping fit was commonly glorified as the sure and only means of excelling others in athletic contests.

The solemn inculcation of good rules of conduct designed to maintain health still proceeds over large areas on the assumption that the one grand goal of youthful aspiration is the urge to run faster, jump higher, hit harder, or sit tighter—as in a tug-of-war—than the other fellow. This is supplemented frequently with appealing pictures of two-fisted he-men and, for the girls, pictures of champion golf or tennis players, hurdle riders and channel swimmers. It is only the stupid boys and girls who fail to grasp the connection between observing the rules of health and winning championships. Now while the establishment of this connection in the minds and hearts of young people is not only legitimate but highly desirable, we have to realize (1) that many of these young people do not care in the slightest degree for the

prowess or distinction of athletic achievement; and (2) that most of those who do care can never attain to championship status and therefore are either going to be discouraged and disillusioned by their failure to reap the promised benefits of their efforts and sacrifices, or, being wise enough to see the catch early, are going to avoid the disappointments by dismissing the contest in advance. There is the need, in other words, of recognizing the fallacy of promising, as an inducement to adopt our health programs, either what our prospects do not want, or what we cannot deliver.

On the other hand, keeping fit has values that are unrelated to the competitive strivings, whether in athletics or business. It is worth while for the man or woman of independent means, and for the solitary genius, to be in good health, although these individuals never come into competition with anybody, although they are without care for achieving "more" of anything, although they do not seek to advance themselves. It is worth while to be well, to make some effort toward attaining health, regardless of the particular rivals that have been introduced to stimulate us—health is a factor in the pursuit of any purpose. It is the fact that human beings have such purposes, that they do set themselves goals, which supplies the motivation, not the fact that in many of the relationships we find ourselves adopting competitive attitudes. People want to be effective: sleep has some bearing on one's effectiveness; elimination of refuse from the tissues and from the body has some bearing on one's effectiveness; a steady hand has some bearing on one's effectiveness. Health is of value in play as well as in work, in the contemplative life as well as in the life of action, in the solitary strivings as well as in the joint struggles against others. But again it becomes unnecessary so to emphasize the various health measures that the rituals and practices obscure their purpose: it is not necessary or desirable to make the pursuit of health a major objective of life.

That there is danger of doing just this appears when parents and teachers and physicians put a premium upon eating spinach or breathing through the nose: There must be something deep and mystical about these performances to make adults so awfully solemn. A little boy whose parents had impressed him with the utter goodness of George Washington, with his perfect compliance with all that is right and proper, startled his mother one day by asking, after a period of silent meditation, "Mums, did George Washington have good bowel movement?"

It is not rare for parents to pay children for being "good," for saying their prayers, for taking the afternoon nap, for gulping the cod

liver oil. Perhaps it is not fair to blame the parents for using the easiest way to get done what we have assured them it is well to get done: but while these procedures teach their lessons, we can hardly consider them as sound parts of health education. They are instead part of the confusion of values which does so much to break down health—mental health. A little girl who had been treated for enuresis by means of graded rewards succeeded in increasing her control satisfactorily. After several months had passed, she was again brought to the clinic because of a serious regression. The doctor asked the child what the trouble was. She replied very simply and directly that she needed a certain doll which she had seen in a shop window.

Paying a child a nickel for taking his nap may be effective, just as paying him a nickel for jumping out of bed promptly may be effective, in insuring the desired conduct. However, it is not health education; it is no more health education than is rewarding care of the teeth with candy or penalizing refusal to take cod liver oil by confinement in the dark. Such procedures establish merely a technic of buying and selling, with a corresponding scale of exchange values—a scale and a technic that do not promote health, that rather injure health.

A questionable use of irrelevant inducements to comply with prescribed usage for the sake of health may be seen in the awarding of lollipops and buttons and laudations in connection with a diphtheria immunization campaign. A community which uses lollipops to induce children to come to the clinic can probably get a higher percentage of attendance than one which uses merely a newspaper announcement that the clinic will be held. A clinic which rewards each child with a star for accepting the prick of the needle will perhaps show a larger percentage of submissions than one which overlooks each child in the line beyond applying the needle, or which merely pats his head and murmurs, "That's a fine boy!"—or "girl," as the case may be.

Undoubtedly the physiological effects of the immunization procedure are uninfluenced by the methods used for inducing the children to come and to submit. There may be by-products, however, that also have significance for the health of the community. There is, for example, the potential snobbery of the star-bearers toward the untouchables. There is further the potential inferiority and envy and resentment of the children who, for whatever reason, fail to be gathered into the charmed circle of the elect. A promising research problem would be to follow up a successful sales campaign of this kind with an inquiry as to the number of anti-vaccinationists produced by the establishment among children of invidious distinctions between those who did and those who did not. Urging people to buy what they do

not know they want may make some of them at least refuse to get what they really need.

There is, nevertheless, an economic aspect to the preservation of health and to the practices designed to further health. Illness, aside from pain or suffering, means loss of time; it means reduced efficiency and poorer workmanship; it means burdening the budget with enforced payments for drugs, doctors, and hospitals, and incidental expenses that are seldom met with relish. Even without illness, lowered physical or mental tone, lowered endurance, flabby performance, and high fatigability are substantial handicaps in the economic life as well as in the enjoyment of life, regardless of competitive pressures. Moreover, there is substantial economy in the prevention of illness and in the maintenance of health, as against curing illness. There is economy in overhauling and anticipating, in prompt attention to irregularities that do appear, as against holding out until forced to quit. Such things people can understand and appreciate and act upon, even children, without demanding a premium for looking after their recognized interests.

A more subtle source of motivation in health education, and one that we have not used as extensively and fully as we might, is just the reverse of our common appeals. Instead of assuming that Old Devil Selfishness is the most powerful drive among the children of Adam, we might consider the fact that there is something inside these children that makes them gregarious, not to say social. They care enough about the companionship of others to make substantial sacrifices in the form of curbing impulses. They learn to count ten before striking, to bite their tongues, to wait for the cake to be passed instead of reaching over. In the same way they learn to bathe, to paint their cheeks, whether from the inside or from the outside, to dance and swim, to play tennis and skate, and to do dozens of other more or less artificial stunts for the sake of getting and holding the attention and esteem of their fellows; they discover, that is, that it pays to be healthy, it pays to observe the rules of health, on purely social grounds. Incidentally, too, the same rules have value in a specialized area of social adjustment, for the children of man are sexual as well as vegetative and social.

Still more subtle apparently, since it is so largely overlooked, is the fact that human beings really do care about others. Mothers, for example, do care about their children in the vast majority of cases—so much so that they have been known to sacrifice their own comfort, their own convenience, their own health, for the health of said children. That is, mothers are eager to keep their children well, or to make them

well in case of illness. They do indeed resist the teachings of doctors and nurses and dentists. They do misapply such health education as comes to them. They do neglect important details; but their hearts are still in the right place. It is not necessary to resort to special inducements to improve their technic. They will not do measurably better if we offer them a silver spoon with each bottle of cod liver oil, or a ticket to the movies with each recovery from whooping cough, or the privilege of seeing their names in the social column if they get rid of the mosquito breeding opportunities on their home premises, or of nits on their children's heads. The mothers, generally speaking, want to do what is suitable under the circumstances, for the sake of their children's health. The need is not so much for better motivation on their part as for suitable motivation on the part of doctors and nurses and teachers—motivation to get at the mentality and the prejudices and difficulties of the parents in question.

Similarly, I feel that we could accomplish more in health education if we recognized that young people care about others. There is a real appeal possible to the responsibility which each can be made to feel for the well-being of the community. Instead of saying to the young fellows, "Sleep nine hours and lick the Hoxey team," we might say, "See that the folks in your home, in your town, get a chance to sleep properly and make a happier home or town." That sounds rather cold, but there is something there we have not been using. Many of the young fellows, at least, would rather have a short life and a merry one; that is, they would rather continue to have a good time their own way than modify their program, sacrifice their good time, on the promise of having more time. I submit, in other words, that for healthy young folks health is no object. They are willing to sleep more if that will help the team, but they are equally willing to go without sleep if that will help anybody. They are ready to engage in most unwholesome occupations and risk their necks, just for the adventure; but they are equally willing to engage in such unwholesome occupations for the sake of other people's health—war for example, or epidemiology, or bacteriology.

Young women too can be interested in health matters quite as effectively by appealing to their desire to be of service as by appealing to their vanity, or the desire to stand higher in the history class, or in an athletic contest. The girl is often more eager to learn about suitable diet and regimen for her younger brothers and sisters than to improve her own practices for the furtherance of her own health. Health is no object; but the prevention of suffering on the part of others may well be. Moreover, there is not merely the sympathy and

considerateness of others that may be made effective in health education, but the growing sense of responsibility for the welfare of others, of the whole community.

Much of our effort fails to produce proportionate results because we assume too great a uniformity (1) as to human motivations; and (2) as to desirable objectives.

It is necessary to accept the fact of individual variation not merely in the physical traits that are measurable, but also in the interests, the concerns, and the desires of men and women. We must therefore take into account the dispositions and goals and purposes of people when making our attempts to influence them. We cannot proceed as though one set of motives could be generally relied upon to produce results. We have to differentiate our work according to age and sex, perhaps according to social and geographical areas, or to cultural background, according to occupational interest or place in the family. For young children it is sufficient to establish standard practice. The chief difficulty here is not that of making people accept our rules and doctrines; it is the fact that rules have to be changed with the increase of knowledge, whereas good indoctrination obstructs further learning. At one time protection against night air was sound teaching; or terminal disinfection; or the avoidance of water with meals, or of ice in water. For young and untrained people the solution is to be found probably not in confusing our teaching with excessive qualifications, but (a) in establishing practices with a minimum of preaching; and (b) in a continuity of guidance and reorientation.

With younger children and untrained adults, there will arise resistance to our efforts to modify habits, or overcome inertia, or inhibit impulses, thwart desires. Here we have to rationalize our recommendations as contributions to their health or well-being. With older children and with adults generally, our recommendations have to be rationalized as resting upon experience, or upon scientific research, or upon statistical generalizations. What good does it do a healthy person to get a medical examination? What good does it do a sick person to have his case recorded with the board of health? What good does it do a dead person to have the cause of his death reported? These questions cannot be answered in the terms assumed; health education has to recognize in each case that there are significant categories beyond the individual under consideration; and it has to proceed on the assumption that the individuals are both (a) able to appreciate these other categories, and (b) disposed to be concerned with them.

As to objectives, we know that we cannot promote health in the abstract. Although we look upon the organism as a unity, although

we think of health as somehow related to wholeness, our efforts are directed toward concrete and specific objectives—diet and air, sunlight and water, elimination and cleanliness, exercise and rest, and so on. We set up standards as to nutritive conditions, musculature, skills, controls, endurance. We then call upon each individual to come up and match himself against these abstract norms, or against selected models of perfection. Now this is essentially unwholesome. It calls for comparisons, and comparisons are odious because they are invidious. They invite people to take pride in the gratuitous gifts of the gods, which is humiliating to any self respecting individual; and they demand of people a mortification for things beyond their control, which must arouse the resentment of any self respecting individual. As those whom we urge thus to attempt the impossible become aware of the futility of aspiring to the 100 per cent score, they become indifferent or even hostile.

In many cases too the individual must resist all efforts to relieve him of his health handicap or disadvantage, for the handicap may be one of his chief assets. One's "abnormality" may serve as the principal source of attention and consideration, not merely for exploitation in the sideshow of the circus, but in the daily relation with others. Flat feet will save one from being the family fetch-and-carry. Susan is so nervous, she has to be spared at every turn. The weak heart, whatever that may mean, may be worth two strong ones. People will hug their defects, for these serve often as powerful weapons in their conflicts with the so-called "normal."

Since most individuals have various sorts of aberrations, in more or less serious degree, it may turn out that our health education can be more profitably based upon a program for attaining optimum general well-being than upon the hope of having all individuals attain the maximum. That means for the individual such help as we can muster toward adapting him to live with his troubles and deficiencies—with himself, in short, for people have to live with themselves even if they retire to the wilderness or take a trip around the world: mechanical appliances for a short leg, spectacles for refractive aberrations, insulin or specialized diet, a change of residence from seashore to mountain or *vice versa*, a change of occupation for some, perhaps even a change of religion or of the spouse. It means an education in the acceptance of the unavoidable and the irremediable, without repining, without self reproach, but also without supine submission to all ills, without futile misdirection of our protests and defiances. And, for all of us, it means increasingly an appeal to group consciousness and group responsibilities, as against an appeal to individual advantage.



Although it is always the individual who is sick or well, hygiene as a form of thought, as a technic, or as an effort toward health, is essentially social.

The educator is usually concerned with all the people rather than with this one or that. The individual starts out perhaps concerned only with himself; but through advancing maturity he sees his own health so intimately tied up with that of his fellows that he finds it more economical and more effective to concern himself increasingly with the community or social activities, content to share in the common gains. In so far, at any rate, as those engaged in health education and those exposed to it have common purposes, they will reënforce each other through their efforts. It is part of the technic of health education to recognize and to utilize the motivations of the public at large. It is part of the aim of health education to get more and more of the public—in schools, in homes, in industry, in government—to adopt the motivations of those engaged in health education.

## Deaths from Silicosis in Great Britain

A MEMORANDUM recently published by the Home Office gives some interesting facts as to the prevalence of silicosis in Great Britain. The frequency of this disease during the last 3 years is shown in the following table:

<i>Industry</i>	<i>Number of cases</i>	<i>Deaths</i>
Ganister mines and silica brick works	80	30
Extraction and manipulation of sandstone	179	25
Pottery industry	322	87
Metal industry (including metal grinding and sandblasting)	81	32
Coal mines	91	20
Total	753	194

Investigations are being made by the Department of Scientific and Industrial Research into the efficiency of various types of respirators. Considerable progress has been made, and it is hoped that before long a respirator possessing the necessary properties will be produced.—*Ind. & Lab. Inform.*, XLIV, 1:23 (Oct. 3), 1932. E. R. H.

# The Psychology of Public Education\*

EDWARD S. ROBINSON

*Professor of Psychology, Yale University, New Haven, Conn.*

MY proposal is that we need to face the problem of public intelligence in the same humble spirit in which the man of science faces other complex realms of natural fact. We need not make a mystery of the public mind. We need not overlook such solid information as we actually possess. But we do need to give up overconfidence. You who have the urgent and practical need to make widespread education effective in matters of health may feel that this plea for an attitude of honest ignorance is a council of despair, but I do not intend it as such. I mean merely to indicate my distrust in the rules and tricks of public appeal which you may obtain for the asking from many confident publicists.

Consider the course of events in the production of a modern motor car. The designer makes use of all available principles of engineering, but when the paper work is done, it is looked upon in the industry as merely a preliminary step. No manufacturer would think of putting that car into production simply because the design looked plausible. Almost every element in the complex machine is sent to the laboratory.

Those of you who are familiar with the slap-dash manner in which the average campaign of public education is put forth must be struck by the contrast between that method and the one followed by the manufacturer of motor cars. The automobile is based upon the most dependable of all the sciences—the science of physics—yet experience has shown that no amount of theoretic knowledge can circumvent the necessity of empirical test. Campaigns of public education, on the other hand, are based upon social psychology, the theory of which is faltering and the principles of which are vague. Should we not expect an even greater need for feeling our way by means of the most careful checks and experiments?

In 1925 I began to study the behavior of the museum visitor in the hope of showing museum curators that they could not expect, on the

---

\* Read before the Public Health Education Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

basis of theory alone, to reach their public in the most effective manner. Two years later I was approached by a museum director who asked me what kind of labels to use in the new building into which his institution was moving. There were a few direct suggestions which any psychologist could make under the circumstances, but my principal answer was that I could show him and his assistants how to test their own ideas of labelling by means of experiments. This proposal was received politely, but I was not requested to go further with the matter. This experience brought home to me the resistance to the experimental method that is to be expected whenever the problems to be dealt with involve human nature rather than the operation of machines. The more human the problem, the more impatient we are with the arduous exercise of the experimental method.

A short time ago the Psychological Corporation made a study of ideas that were being used in national advertising campaigns. Two thousand housewives were asked such questions as these: What refrigerator is *Dual Automatic*? What toothpaste advertises *Pink Toothbrush*? What company selling canned fruit advertises *Just the Center Slices*? What company advertises *I Smell Smoke*?

To quote from Dr. Henry C. Link: "The correct answers are as low as 20 per cent, 30 per cent, and 40 per cent of the total number of housewives asked in regard to certain campaigns, and as high as 50 per cent and even 75 per cent in other cases." When the amount spent in advertising was considered, one slogan was found to be 150 times as effective as another.

Now the astonishing fact is not that one slogan could be so much more effective than another, but that thousands of dollars were spent in propagating such slogans without any more serious effort to measure their efficiency than was represented by the armchair judgment of an advertising expert. Link's study was not carried out until the campaigns had actually been under way for months. Let us recall the automobile maker. Would he for a moment go ahead with production on a car if he had nothing better than an expert's surmise that it would work? If he did, we should have one motor car with 3 or 4 times the efficiency of another in the same price class.

The public museum offers an almost ideal example of the practical value of the experimental approach to the public mentality. If we make a possible exception of the technical study collections which are displayed for the benefit of scholar and connoisseur, we may properly say that the public museum is simply an intricate pattern of psychological stimuli. It functions only in so far as it has some actual influence upon the thoughts, feelings, and actions of its visitors. The

setting up of new displays, the development of lecture courses, the labelling of the exhibits: all these are merely preparatory steps. The museum is not effective until certain dynamic relations arise between its formal physical features and the public that flows through its corridors. Yet, until 1925 no serious effort was made to attain objective, reliable knowledge of what the public museum does to its visitors. Since then a large number of the basic problems of museum functioning have been at least touched by experimental and observational procedures.

Consider first the sheer size of the museum building. Do people act differently in large and small museums? Visitors have been picked up upon their entrance into the building and followed, without their knowledge, through the course of their visit. Each stop has been recorded as to location and length. The speed of travel early and late in the visit has been determined. From such results it has been possible to show that the large museum is large at a cost. A person confronted with 1,000 pictures shows in his behavior the competition for his attention. It might seem upon first thought that such a finding has only academic interest, because big museums are not likely to make voluntary reductions in size; but the big museum is constantly making decisions as to the size of its public displays. Some of the best administrative work in the museum field has consisted in setting aside for study purposes objects that had formerly distracted and consequently hurried the ordinary visitor.

Every museum gallery and corridor presents in its size and shape problems that only the observational method can solve. We have found that under ordinary circumstances—that is in relatively symmetrical buildings and rooms—there is a strong tendency for the public to bear to the right. This tendency has shown itself to be remarkably similar in different museums and even in different cities. About 75 per cent of the visitors bear to the right and about 25 per cent to the left. This finding becomes of the first importance if we wish to arrange paintings or cases in such a manner as to tell a continuous story. But before these results were obtained, there was a persistent tendency upon the part of curators to lay out exhibits in direct opposition to this habitual line of march. Working from blue prints the eyes have moved to the left and then around the building as they would read a line of print. But the visitors have continued to walk first to the right and then around to the left. One museum which I recently visited had screaming signs to force people to go first to the left in order to fall into the chronological order of the exhibits, but there would have been no reason to erect signs if the natural routes of

visitors had first been considered. There are many more findings obtainable regarding the influence of door position and of rooms of peculiar shape, but it is safe to say that if curators without the aid of controlled observations missed this distinction between right and left walls, they are equally in need of such observations to determine the attention values of less obvious locations.

Another purely formal problem involves the optimal use of a given amount of exhibition space. During the last few months intensive investigations of this problem have been carried on in the Buffalo Museum of Science and in the Pennsylvania Museum of Art. Earlier laboratory work had shown that the crowding of displays may play a more pronounced rôle in setting up so-called museum fatigue than do hard floors and poor ventilation. In both of the museums just mentioned it has been possible to demonstrate for a given picture gallery, or for a given case of scientific materials, definite limits beyond which the addition of objects or pictures brings about a marked decrease in interest in the gallery or case as a whole. We actually found it possible to increase the amount of time which visitors would spend at certain exhibition cases by removing some of the materials from the cases. Museum men once comforted themselves by saying that it was their duty simply to make available whatever objects of art, science, or history they might have at hand, and it was the duty of the public to select for study or enjoyment those objects that struck their fancy. These recent investigations show, however, that the multiplication of pictures or objects on display does not simply increase the range of choice for the visitor, but seems rather to increase the burden of making a choice.

Some of these studies of the museum visitor have touched upon the most fundamental conceptions of modern museum practice. In recent years there has been a great development of period rooms in the art museums of both Europe and America. In the main this has been a happy development and one which has undoubtedly increased the appeal of many a museum. But new ideas of all kinds have a way of creating new philosophies, and these philosophies are not always as sound as the ideas that have suggested them. The period room method won a number of adherents who decided that the period conception ought to dominate all art displays. Their argument was plausible. They said that lines of paintings hung on bare walls were depressing. These pictures were created for the decoration of furnished interiors and they should be viewed in the general setting appropriate to the artist's time. In other words, if furniture, rugs, hangings, clocks, bric-a-brac, pictures, and the rest could be gathered

into pleasing combinations, the naturalness of the whole scene would give the visitor a feeling of repose and increase his interest in the individual art object.

Now the method which I am urging upon you is inherently suspicious of just such convincing arguments as this. Because of the splendid sporting spirit of a museum director who, himself, is a fairly enthusiastic exponent of the period idea, it was possible to carry on experiments upon public interest to determine the influence of the setting of art objects. In the main we found that the individual object, such as a painting, fares somewhat better in the relatively abstract atmosphere of the gallery than it does in combination with period furniture. In other words, the hypothesis that the period room increases interest in the individual object because the monotony of a single type of object is broken, does not hold up under experimental scrutiny. The period room remains the best method of displaying the total art of interior decoration for a given period, but those plausible effects which it was supposed to have upon the visitor probably do not bear close examination.

Thus far I have spoken of the check which the empirical method is able to apply to current devices for dealing with public interest. But the ultimate uses of the method should go beyond the proof that present practice is or is not soundly based. It is feasible to make use of the experimental procedure at an early stage in the development of any program of public appeal. Let me cite, as an example, some recent studies of the label question in connection with paintings. Instead of taking labels already prepared by a curator unaware of the possibilities of experimental test, we decided to construct labels in such a way as to bring out the importance of the several elements in the labelmaker's technic. We distinguished the types of information that could be given in regard to a painting. The label might place the picture historically; it might say something of the technic of its production; it might explain the story; or it might attempt to explain the esthetic effect at which the painter was aiming. Having distinguished these several elements in label-making, we had labels written emphasizing some one of these elements or some combination of them. We then measured the influence of these several types of label, not upon label-reading, but upon interest in the painting itself. As a result we were able to secure labelling of a given picture which increased the interest in that picture by as much as 50 per cent. The best labels were not exactly what one would have guessed beforehand. The esthetic label, for example, had a high order of effectiveness, though many of us would have predicted a poor fate for it.

The experimental approach to the problem of public influence thus offers a constructive as well as a critical service. In one case, by developing labels through a process of experimentation, it was possible to increase the length of stay of the average visitor to the 69th Street Branch of the Pennsylvania Museum by 33 per cent. The experimentalist is far more pleased with such a finding than he is with the most dramatic debunking of traditional practices.

And now let me return from the special problems of the museum to the more general problems of public education. It has been my purpose to convince you that the public mentality is sensitive and complex. No list of motives or instincts to be found in the textbooks will give you accurate grounds for predicting the fate of a given appeal. Before experimental checks have been instituted, all we can have is a hunch. However certain we may feel that the public will be soothed by this slogan or excited by that, or that these simple facts will be readily understood by the masses, we should remember that we are evaluating our own feelings and capacities and not those of the public. The final test of a new type of carburetor is always applied when that carburetor is actually in operation on a motor car. The final test of any program of public education and appeal must wait until that program can be given an experimental circulation.

If widespread health education is to be continued on its present scale, it would pay you to set up, as the public museums have done, an experimental center where objective standards of educational efficiency can replace the hunch of the artist, the poet, and the advertising man.

#### REFERENCES

- Psychological Problems of the Science Museum. *Museum News*, 8:9-11,  
Psychological Studies of the Public Museum. *School and Society*, 33:121-125, 1931.  
Exit the Typical Visitor. *J. Adult Education*, 3:418-423, 1931.  
The Behavior of the Museum Visitor. *Publ. Amer. Asso. Museums (New Series)*, 5:72, 1928.

#### *The Mental Hygiene Symposium*

*from the Washington Annual Meeting will be published in the  
March JOURNAL. This includes papers by*

*Ira S. Wile, M.D.,*

*William A. White, M.D.,*

*Esther Richards, M.D.,*

*Clarence M. Hincks, M.D.,*

*and Elizabeth Adamson, M.D.*

# Health Aspects of Fruit Beverages\*

WALTER H. EDDY, PH.D., F.A.P.H.A.

*Teachers College, Columbia University, New York, N. Y.*

RECENTLY I took occasion to run through some of the new texts on nutrition just to list aspects of fruits as a dietary essential that had merited attention by the various authors. Here are some of the values claimed:

TABLE I

1. Good for children to meet a natural craving for sweets, to satiate without danger of excess of sugar eating or caloric intake. Also good for adults for the same reasons with special reference to the matter of obesity.
2. Good as regulators of gastrointestinal function stressing:
  - a. laxative effect or
  - b. the contribution of vitamins A, B, C, and G.
  - c. their influence on bacterial flora.
3. Good as preventive of acidosis, regulation of urinary acidity, building of alkali reserve, etc.
4. Good as sources of essential mineral elements, Ca, P, Fe, Cu, Mn, etc.
5. Exceptionally important antiscorbutics.
6. Important factors in the prevention of dental caries.
7. Important as giving palatability and flavor to diets without increasing unduly costs or calories.

These values alone would justify the significant place fruits and fruit beverages have gained in the estimation of the nutritional adviser and the research that is necessary to measure the contribution of specific fruits to the consumer; but I am not at all sure that the above list of values is complete.

During the past 5 years I have been interested in new phases of fruit contribution to nutrition, and as opinions and data on the above points are already available in texts and reprints, I felt it worthwhile to confine my presentation here to some of this experimental work as suggesting possible new values worth study and evaluation.

In 1925, Chaney and Blunt<sup>1</sup> reported that when 600-700 c.c. of orange juice was added to the diet of 10-11 year old girls, calcium retention was increased to a degree not explicable by the amount of calcium contributed by the juice itself. The suggestion was that in some way the juice actually increased the utilization of the calcium in other articles of diet consumed with the orange juice. If such function exists it is an addition to the list given above. It is also

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.



important to know whether this function is confined to orange juice or is shared by other fruit beverages and pulps. It is further important that we learn how the effect is accomplished.

For the past 7 years I have been experimenting with this hypothesis of Chaney and Blunt. I would like to trace certain aspects of this experimentation, its findings and its perplexities which must still be resolved. Also some collateral functions that have developed in the research.

At first my studies were largely confined to the banana. You may object to my citing this work as not germane to a fruit beverage "subject," but with the development of dehydrated banana (banana powder or sugar) this fruit offers possibilities of milk modification or other forms of beverage that put it in my field of report today. My earliest studies were conducted with the coöperation of Dr. Sidney V. Haas and aimed to duplicate those of Chaney and Blunt with the banana as the fruit instead of the orange. Table II summarizes this first experiment.

TABLE II  
EXPERIMENT 1.

*Subjects:* 3 boys at the Hebrew Infant Hospital aged 3-4 years. Basal diet built on approximately 840 gm. cooked farina, 40 gm. butter, 540 gm. milk, 100 gm. bread, 42 gm. eggs, 2 gm. biscuit, and 180 gm. potatoes daily. Actual intakes measured by nurse daily. After a period on this diet a carmine capsule was given to mark the feces and after feeding the diet was continued but with two bananas daily replacing some of the carbohydrate of the previous diet so as to make calorie intakes practically the same. Feces and urines collected during both periods and analysed.

		RESULTS					
<i>Child</i>	<i>Period</i>	<i>Ave. Daily Intake Calcium Grams</i>	<i>Daily Output Grams</i>	<i>Amount Retained Grams</i>	<i>Per Cent Retained</i>	<i>Amount Absorbed Grams</i>	<i>Per Cent Absorbed</i>
		<i>Grams</i>	<i>Grams</i>	<i>Grams</i>		<i>Grams</i>	
" L "	Non-banana	0.7266	0.4476	0.2790	38	0.3017	41
	Banana	0.7412	0.4035	0.3377	46	0.3613	48
" F "	Non-banana	0.7914	0.4485	0.3456	43	0.4096	52
	Banana	0.7676	0.2991	0.4685	61	0.5134	67
" B "	Non-banana	0.7499	0.5480	0.2019	27	0.2938	39
	Banana	0.7747	0.6541	0.1306	17	0.2035	26
<i>Child</i>	<i>Period</i>	<i>Ave. Daily Intake Phosphorus Grams</i>	<i>Daily Output Grams</i>	<i>Amount Retained Grams</i>	<i>Per Cent Retained</i>	<i>Amount Absorbed Grams</i>	<i>Per Cent Absorbed</i>
		<i>Grams</i>	<i>Grams</i>	<i>Grams</i>		<i>Grams</i>	
" L "	Non-banana	1.4687	0.4846	0.9841	67	1.3506	72.7
	Banana	1.4007	0.5020	0.8987	64	1.2170	64.0
" F "	Non-banana	1.8258	0.4360	1.3898	76	1.7464	78.5
	Banana	1.5485	0.5343	1.0142	65	1.4268	71.3
" B "	Non-banana	1.8947	0.5296	1.3651	72	1.7896	76.6
	Banana	1.7207	0.6429	1.0778	62	1.5245	70.4

In Chaney and Blunt's work the orange juice increased retention of both calcium and phosphorus. In this series I got increased retention of calcium with 2 subjects but not with the 3d. I got no increase in retention of phosphorus with any of the children on banana. My diet was in general not optimal for Ca/P ratio, that ratio being 0.43 during the non-banana period and 0.49 during the banana period. However the contrast between the effect on phosphorus and on calcium gave partial support to the view that the banana had, like Chaney and Blunt's orange juice, brought about greater retention of calcium. Partial confirmation only, because 1 case failed to develop this difference.

Later I had, with Dr. Haas, the opportunity to repeat these observations in part in a study of infants divided into 2 groups, 1 group on milk modified with banana sugar and the other on milk modified with cane sugar. These results are shown in Table III together with some studies made by Brown and Courtney.<sup>2</sup>

TABLE III  
EFFECT OF BANANA-MILK BEVERAGE ON CALCIUM ABSORPTION

Data	<i>Diets</i>	
	<i>Milk and Cane Sugar</i>	<i>Milk and Banana Sugar</i>
	<i>Grams</i>	<i>Grams</i>
Wt. feces dry	1.926	2.761
Ca intakes	0.9513	1.0846
Fecal calcium	0.1524	0.1198
Difference	0.7939	0.9648
Per cent Abs.	84%	89%
	<i>Grams</i>	<i>Grams</i>
P. intakes	0.7354	0.8937
Fecal P.	0.0345	0.0316
Difference	0.7009	0.8621
Per cent Abs.	95%	96%
Ca/P ratio diet	1.29	1.21

BROWN AND COURTNEY EXPERIMENT

(*Canad. M. J.* 21:37, 1929)

<i>Data</i>	<i>Banana Children</i>	<i>Controls</i>
Grams Ca intake	1.8	1.92
Per cent retained	18.4	19.9
Grams P. intake	1.86	1.90
Per cent retained	21.6	21.2
Grams Mg. intake	0.416	0.329
Per cent retained	23.6	21.9
Ca/P ratio diets	0.97	1.01

Again results are not completely confirmatory. The modified milk series showed in every case (about 10 infants on each diet) a better absorption of calcium with banana sugar than with cane sugar, but we did not measure actual retention in this series. On the contrary, Brown and Courtney with their diets (children 5 to 13 years of age on 3 to 5 bananas per day) failed to get increase of calcium retention but did get increase in magnesium retention.

These experiments, especially mine with children on mixed diets, lacked considerable of satisfaction as to accuracy of intake figures and did not permit of as rigorous control in various matters as was desirable. I therefore next set up a series of white rat studies where these matters could be better controlled. In this series I used 6

TABLE IV

EFFECT OF VARYING PROPORTIONS OF BANANA IN RAT DIETS ON RETENTION OF CALCIUM AND PHOSPHORUS AND OTHER DATA

Diets tested:	No. 1.	2/3 milk powder and 1/3 white wheat flour				
	No. 2.	2/3 milk powder and 1/3 banana powder				
	No. 3.	1/2 milk powder and 1/2 white wheat flour				
	No. 4.	1/2 milk powder and 1/2 banana powder				
	No. 5.	1/3 milk powder and 2/3 white wheat flour				
	No. 6.	1/3 milk powder and 2/3 banana powder				
Data Obtained	On Diet One	On Diet Two	On Diet Three	On Diet Four	On Diet Five	On Diet Six
Ave. Ca intakes (grams)	0.1890	0.1847	0.1133	0.1216	0.1015	0.1469
Amt. absorbed (grams)	0.0920	0.0864	0.0527	0.0668	0.0547	0.0942
Per cent absorbed	49	47	54	55	54	64
Total output Ca (grams)	0.1085	0.1136	0.0689	0.0706	0.0544	0.0554
Per cent retained	43	39	39	42	47	57
Ave. (grams) P. intakes	0.0650	0.0633	0.0435	0.0439	0.0353	0.0440
Amt. absorbed	0.0277	0.0235	0.0192	0.0176	0.0153	0.0142
Per cent absorbed	43	37	44	40	43	32
Total output (grams) P.	0.0601	0.0609	0.0395	0.0417	0.0360	0.0462
Per cent retained	7	4	9	5	-2	-5
Ave. (grams) N. intakes	0.3962	0.3370	0.3223	0.2373	0.2938	0.2338
Amt. absorbed	0.3356	0.2610	0.2821	0.1682	0.2588	0.1210
Per cent absorbed	85	78	88	71	88	52
Total output (grams) N.	0.3595	0.3123	0.2991	0.2344	0.2263	0.2374
Per cent retained	9	7	7	1	23	-1.5
Dry wt. (grams) feces	0.8788	1.1950	0.6179	1.0806	0.4989	1.6994
Blood Ca/P ratio	17.9	20.8	21.9	23.3	21.2	19.3
pH Stomach	4.8	5.7	4.1	4.4	3.6	3.9
S. Intestine	6.1	6.4	6.5	6.5	6.5	6.5
L. Intestine	8.5	7.9	7.6	6.3	7.3	5.6

different diets and 3 rats on each diet. The character of the diets and the analytical data compiled are given in Table IV.

These studies were illuminating on several points. It was evident that the fruit produced a definite increase in volume and weight of fecal output and that with this increased output there was less retention of phosphorus and nitrogen, as would be expected, but that if the amount of fruit was sufficiently great in proportion to other factors in the diet there was, in spite of this increased fecal output, a markedly greater absorption and retention of calcium. It is true that in the banana diets given the actual intakes of calcium were slightly greater than in the control groups; but I do not believe of sufficient difference in amount to account for the way calcium behaved when contrasted with the behavior of nitrogen and phosphorus.

Of the other data noted we were especially interested in the values of the gastrointestinal tract for it might be that the explanation of increased calcium absorption lay in the effect of the banana sugar on the development of aciduric bacteria. Such a development would make a more acid intestine and hence tend to make the calcium compounds more soluble, more readily absorbed. The effect in the large intestine seemed to confirm this view. It was felt that this effect required more study and also that a more direct method of measuring absorption than by subtraction of fecal output from intake was desirable.

In pursuit of the first objective I took occasion in connection with the study of the infants on modified milk diets noted in Table III to collect the stools and have Gram-positive/Gram-negative ratios run on these stools. In general the ratios obtained confirmed the view that the banana tended to increase the Gram-positives. The ratios on the milk and cane sugar were of the following order of magnitude:  $1/6$ ;  $1/40$ ;  $1/18$ ; etc., while the ratios of the milk and banana sugar group was of the order of  $1/1$ ;  $1/2.5$ ;  $1/0.7$ ;  $1/1.2$ ;  $1/0.9$ ; etc., to quote some of the figures actually obtained. Furthermore, when we changed the diets of some of these infants, placing those that had been on milk and cane sugar on the banana mixture and *vice versa*, we accomplished in less than a week a reversal of the previous ratios.

Such ratios from stool smears are not too conclusive as characteristic of the conditions of the entire intestinal regions. At this point I therefore enlisted the coöperation of Dr. Lloyd Arnold of the University of Illinois Medical College. Dr. Arnold attempted to study the problem with the aid of white rats and suitable technics for accurate measurement of Gram-positive/Gram-negative ratios and pH values of segments of the rats' gastrointestinal canal. The diets

TABLE V

DR. LLOYD ARNOLD'S OBSERVATIONS ON THE EFFECT OF SUGARS ON  
INTESTINAL FLORA AND HYDROGEN ION CONCENTRATION

*Rat Diets Used:*

18% purified casein	and 68% carbohydrate which was cornstarch,
8% butter fat	dehydrated banana, sucrose, lactose, or a
2% cod liver oil	mixture of lactose and banana powder.
4% Osborne and Mendel salt mixture	

Each animal received in addition to the above diet 3 per cent of dried yeast daily and one meal of cabbage and of carrots weekly.

*Gram-Negative/Gram-Positive Ratios:*

<i>Carbohydrate Used</i>	<i>Stom.</i>	<i>Duod.</i>	<i>Jej. 1</i>	<i>Jej. 2</i>	<i>Jej. 3</i>	<i>Ileum</i>	<i>Caecum</i>	<i>Rectum</i>
Sucrose (-12th week)	1:1	1:6	1:4	1:6	1:5	1:3.5	1:2.5	1:1.5
Cornstarch (4-5th week)	1:4	1:1.5	1:2	1:2	1:2.5	1:2.5	1.5:1	1:2
Banana (5-8th week)	1:8	1:6	1:10	1:8	1:6	1:5.1	1.5:1	1.5:1
Banana plus lactose	1:16	1:12	1:22	1:21	1:11	1:14	1:19	1:18
Nursing rats (lactose)	1:30	1:31	1:35	1:30	1:44	1:44	1:8	1:6

*pH of Gastrointestinal Segments:*

<i>Carbohydrate Used</i>	<i>Stom.</i>	<i>Duod.</i>	<i>Jej. 1</i>	<i>Jej. 2</i>	<i>Jej. 3</i>	<i>Ileum</i>	<i>Caecum</i>	<i>Rectum</i>
Sucrose	2.5	6.2	6.4	6.4	6.6	6.9	6.7	5.6
Cornstarch	2.7	6.3	6.4	6.4	6.3	6.5	6.5	6.5
Banana	2.6	6.3	6.4	6.4	6.4	6.8	6.6	6.6
Banana plus lactose	2.6	6.1	6.1	6.2	6.3	6.6	5.8	5.9
Nursing rats (lactose)	2.8	6.2	6.4	6.4	6.4	6.9	6.5	6.4

he used, the regions studied, and the results obtained, are given in Table V.

These results partially confirm the theory that the banana sugar increases the acidic condition of the intestine. It did produce a greater proportion of Gram-positives than of Gram-negatives, but was not as potent for this purpose as lactose. The effect on the pH of the tract was not so evident in this series. Dr. Arnold, however, studied further the condition of the Gram-positive and Gram-negative organisms in each series. He made a most interesting discovery; namely, that the viability of the organisms in the different carbohydrate series showed marked differences—in general, that the banana sugar markedly reduced viability in the coli types. The data on this point are given in Table VI. This was a quite new property of the

TABLE VI

DR. ARNOLD'S DATA ON THE VIABILITY OF COLI ON DIFFERENT CARBOHYDRATES

<i>Diet</i>	<i>Small Intestine</i>		<i>Large Intestine</i>	
	<i>Stainable</i>	<i>Viable</i>	<i>Stainable</i>	<i>Viable</i>
Cornstarch	10	1	10	10
Sucrose	10	2	10	10
Banana	10	0	10	2
Lactose	10	1	10	5
Nursing	10	0	10	5

fruit and immediately suggested that it might be of significance in explaining the effect of banana in the treatment of celiac disease, pyloric spasm, sprue, and other cases of intestinal disturbance which had been shown empirically to respond to treatment with this particular fruit.<sup>3,4,5,6</sup> To test this point out Dr. Arnold initiated a new series of studies to determine the effect of banana powder on *B. enteritidis*.

The result of the first series is given in Table VII. If these results

TABLE VII  
THE EFFECT OF BANANA SUGAR ON *B. ENTERITIDIS*  
(Preliminary Report by Dr. Lloyd Arnold)

Using rat diets already described in Table V, 18 rats on each of the cornstarch and banana combination were used in this series.

Series L. After feeding the rats 4 weeks on the diets 9 in each set were fed *B. enteritidis* by stomach tube with the following results:

Time Elapsed	Cornstarch Series	Banana Series
After 24 hours	<i>B. enteritidis</i> in the feces	<i>B. enteritidis</i> in the feces
After 48 hours	<i>B. enteritidis</i> in the feces	<i>B. enteritidis</i> in the feces
After 3-8 days	<i>B. enteritidis</i> in the feces	Feces negative
After 9-12 days	Rats had diarrhea; fur was rough; animals prostrated. <i>B. enteritidis</i> in feces in practically pure culture. 2 deaths, 1 on 10th day and 1 on 11th	Animals in good condition Feces negative
After 13 days	Survivors recovering	All normal
After 14 days	Survivors normal	All normal
After 5 weeks	<i>B. enteritidis</i> isolated from small intestine of 5 out of 6 rats. 5 had <i>B. enteritidis</i> in spleen. 2 had <i>B. enteritidis</i> in mesenteric lymph nodes. 1 had <i>B. enteritidis</i> in liver and 1 had it in heart blood	No <i>B. enteritidis</i> recoverable from any segment of the gastrointestinal tract. Spleen, liver, kidney; mesenteric lymph gland and heart blood sterile.

Series B. 6 rats on banana and basal; 6 on cornstarch and basal; and 6 on cracked corn only.

1. *B. enteritidis* added to drinking water for one day.
2. *B. enteritidis* given intraperitoneally.

Results:

Results:

Cracked corn series: diarrhea feces pract. pure culture on 7th day. Fur soiled and rats prostrated

Cracked corn series: 6 rats died in 48 hrs.

Cornstarch series: 2 sick on 5th to 7th days and then recovered

Cornstarch series: 2 died in 24 hrs. 2 diarrhea with recovery

Banana series: no disturbance, normal weight gains

Banana series: no visible effect on the rats

are confirmed by further studies, we have evidence of an entirely new rôle of the fruit, viz., the actual destruction of activity in *B. enteritidis* and perhaps a new use for the fruit in the handling of intestinal disturbances of colon bacillus origin.

TABLE VIII

THE EFFECT OF FRUIT JUICES ON THE RATE OF ABSORPTION OF CALCIUM SALTS

Experiment 1. The relative rate of absorption of CaCl<sub>2</sub>; Ca lactate; and Ca gluconate in water solution.

Salts	Per cent absorption in					
	30	60	90	120	150	180 minutes
Calcium chloride	29	42	46	62	71	66
Calcium lactate	10	30	42	41	50	60
Calcium gluconate	20	21	21	25	25	27*

\* Calcium gluconate found mainly in the large intestine after the first 30 minutes.

Experiment 2. Effect of medium of solution on CaCl<sub>2</sub> absorption rate.

Solutions	Per cent absorption in		
	30	60	90 minutes
Calcium chloride in water	16	20	31
Calcium chloride in grape juice	30	44	44
Calcium chloride in orange juice	3	44	63
Calcium chloride in tomato juice	22	48	

Experiment 3. Repetition of Experiment 2 on grape juice.

Per cent absorption in 30 minutes		Per cent absorption in 60 minutes	
Calcium chloride in water	Calcium chloride in grape juice	Calcium chloride in water	Calcium chloride in grape juice
30.35	4.81	41.07	70.57
27.28	10.00	46.41	65.38
32.14	10.00	64.28	64.42
28.57	16.92		70.57
	16.93		72.30
	12.59		68.84
	25.59		79.20
	13.46		65.38
	11.73		61.99
			65.38
Ave. 29.51	13.56	Ave. 50.59	68.40

While these studies were progressing in Chicago, I turned my own laboratory's attention to direct measurement of absorption of calcium in the presence of different fruit juices. For this purpose I modified the method of Cori.<sup>7</sup> This consisted of feeding rats by stomach tube a measured quantity of the substance whose absorbability was to be determined (sugar in Cori's experiments) after a 48-hour period of fasting; then killing the rats at intervals of time selected, recovering the alimentary tract contents and analyzing to determine the amount

of the fed product still present. We found by studies of starved rats that a certain residuum of calcium remains in the tract even after 48 hours' fasting. This amount was found to be fairly constant for rats of similar dietary history and could be used for correcting the analytical recoveries. We have to date made use of this method to study the rate of absorption of calcium salts such as chloride, lactate and gluconate in water solution and also of the effect of solution in orange juice, tomato juice, and grape juice. Table VIII shows some typical results.

These results in general give further support to the suggestion of Chaney and Blunt, in 1925, that fruit juices may have a supplementing effect in making more utilizable other factors in food mixtures. The mechanism by which the effect is accomplished is not demonstrated by our experiments to date but several leads have been suggested and are being followed.

I have presented these experiments to call attention to the fact that we have not yet exhausted the health contributions of common fruit juices and pulps, and to suggest the desirability of further search in this field. I believe that the clinical experience with fruits in certain pathological cases, if collated and analyzed, would still further extend the list of values contributed by these forms of protective foods. I have records of sprue cases where fruit carbohydrate was handled and cereal form not tolerated. Such clinical data stimulate curiosity as to the etiological factors involved, to a comparison of fruits to see in which the property is inherent, and in which it is lacking and why. Such knowledge is a means to better preservation of health and of better selection of foods to that end.

## REFERENCES

1. Chaney, M. S., and Blunt, K. *J. Biol. Chem.*, 66:829, 1925.
2. Brown, Alan, and Courtney, Angelia M. *Canad. M. J.*, 21:37, 1929.
3. Haas, Sidney V. *Am. J. Dis. Child.*, 28:421, 1924.
4. Haas, Sidney V. *J. A. M. A.*, 99:448, 1932.
5. Irish, H. E. *Arch. Pediat.*, 43:533, 1926.
6. Marfan, A. B. *Nourrisson*, Nov., 1929.
7. Cori, C. F. *J. Biol. Chem.*, 66:691, 1925.



## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZŮCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMAN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

## USE YOUR PUBLIC HEALTH DEGREES

VARIOUS college degrees in public health have now been awarded to more than a thousand persons, most of whom are regularly engaged in professional health activities. As time goes on many additional degrees will be granted, so that in the future there will be a large body of specially trained sanitarians whose professional attainments will be indicated by these public health degrees.

In order that the general public may become familiar with the fact that public health is a distinct profession and requires special instruction, individuals who are fortunate enough to possess professional degrees in this subject should make a practice of using them constantly. Thus, the physician who is also a doctor of public health should write himself not merely, "John Smith, M.D.," but should put his name as "John Smith, M.D., Dr.P.H." So too, the nonmedical sanitarian who has his doctorate or certificate in public health should never hesitate to employ it as an appendage to his name when used in a professional capacity. Letterheads, professional cards, and other materials employed in connection with public health duties should always display these scientific degrees, as should articles and reports.

Those persons who have the well known degrees such as the "Ph.D." or "Sc.D." might likewise, if they have been granted in public health, write after their names, "Sc.D. (Hygiene)" or some similar indication of their professional training. The result will be that the public, by acquiring a proper appreciation of these doctorates.

in the sciences of public health, will gradually come to demand that the sanitarian of the future must be a trained scientist, and that all guardians of the public health must be appointed primarily from among those who possess the necessary qualifications. Public health degrees should, therefore, be displayed wherever and whenever possible.

### ONLY THREE CENTS FOR HEALTH

ONE of the most striking charts in the recent final report of the Committee on the Costs of Medical Care\* shows how "Our Medical Dollar" is spent. Out of a total bill of \$3,656,000,000 for 1929, only 3.3 cents in every dollar is spent for public health, \$121,000,000, to be exact. On the other hand, we spend 3.4 cents or \$193,000,000 on cults and quacks and 18.2 cents or \$665,000,000 on drugs of which \$360,000,000 is for patent medicines, for the most part worthless medication. Physicians (29.8 cents), hospitals (23.4 cents), dentists (12.2 cents), nurses (5.5 cents), and unclassified (4.2 cents), make up the remainder of the "medical dollar."

The American Public Health Association, from exhaustive study of the subject, lays down a standard of \$2.50 per capita for public health in urban centers, and a somewhat larger expenditure in rural communities. On this basis the public health expenditures of this country should equal at least \$300,000,000, or approximately 10 cents of the "medical dollar."

How shall we ever attain a goal of reasonable public health provision for all of our American citizens? The answer, based on the experience of the past two decades, is clear. Education, organization, and demonstration are three words that tell the story of the past and give an answer to the question of the future.

For two and a half decades the public health associations and allied groups of this country, in a nonofficial capacity and with meager resources, have been organizing, educating, and demonstrating in every part of the United States that "public health is purchasable." Cities, counties, states have been organized. Tuberculosis, venereal disease, child health, and several other special problems have been stressed. Public funds have been sought and secured for institutions, nurses, clinics, health departments, and other public health agencies. For every dollar expended by the private associations in promoting public opinion, the city, county, and state treasuries of the country have expended \$10, \$20, \$50, and in many instances \$1,000 or more.

\* *Medical Care for the American People*. 1932. 214 pp., \$1.50.

The American public needs the constant stimulus of some group or groups to keep up interest in any subject of common interest, even one so vital as that of the public health. That 3.3 cents offers a challenge to all who are engaged in public health work to let their friends and their constituencies know that at least three times as much effort is demanded, if we are to reach the desired goal of \$2.50 per capita.

## LETTER FROM GREAT BRITAIN

### AN OUTBREAK OF ENTERIC FEVER

IN recent years outbreaks of enteric fever have been so rare that when in any particular neighborhood anything resembling a large grouping of cases occurs, it is not surprising that people become alarmed. In the case of the epidemic during the autumn months in and around the small town of Malton in Yorkshire, this was sufficient to cause a certain amount of disorganization in a variety of directions, and to arouse among mothers of families a degree of fear sufficient to lead them to determine not to send their children to school.

Incidentally also, it rendered necessary a visit to the area of the outbreak by the Chief Medical Officer of the Ministry of Health (Sir George Newman) and, following that visit, the issue of a special statement by the Ministry. In this it is shown that between September 23, when the first case was admitted to the local hospital on a diagnosis of "pneumonia and diarrhea," and November 17, 243 cases with 14 deaths had been notified.

The infection in the majority of instances is shown to have been water-borne, and to have reached the water supply from the first case by way of the drain of the hospital, later found to be seriously defective near its junction with the sewer. For some time, it appears, the bulk of the drainage, in-

stead of entering the sewer, had been deposited for an extended period, according to the statement, "subterraneously upon land immediately contiguous both to the low-lying water well and to the pumping station (by which the well water was conveyed to the reservoir)."

The dates given in the Ministry statement are extremely important, and show that the period elapsing between the admission of the first case to hospital and the beginning of the flood of notifications was almost exactly a month. It shows also that comparatively only a very short time elapsed before those in charge of the investigation were able to put their finger upon the source of infection, and to adopt precautions designed to bring the epidemic to an end.

The steps taken included the giving of attention to the drainage system, chlorination of the water supply, and protective inoculation of members of the public. Also, "the future of the water supply is under consideration both from the medical and from the engineering points of view."

### REPORT OF THE SENIOR MEDICAL INSPECTOR OF FACTORIES

MEDICAL inspection of factories in this country forms no part of the duty of the health authorities, and is in the hands of the Factory Department of the Home Office. For any

account of the work done it is necessary, therefore, to turn to the report of the Chief Inspector of Factories and Workshops to the Secretary of State for the Home Department, and not to that of the Chief Medical Officer of the Ministry of Health.

The report of Dr. John C. Bridge, the Senior Medical Inspector of Factories, and successor to Sir Thomas Legge, to whose death I referred some months ago, is invariably, so far as health officers are concerned, the most important part of the Factory Report. Of that for 1931, even though it has been distinctly curtailed, this may be said. The curtailment is, of course, the result of the general conditions, and this also is responsible for a reduction in numbers in various directions.

Notifications of industrial diseases—lead poisoning, anthrax, etc.—for example, are generally the lowest for some years, and though there may be some actual improvement, it is undoubted that in great part the low incidence is a reflection of the state of the labor market. In the case of lead poisoning, which returns 168 cases as against 265 for 1930, both factors appear to have operated, Dr. Bridge's conviction being that there is today much better protection from the risk attendant upon the use of lead. Of the industries, that in which the most striking improvement has occurred is pottery, 9 cases only as against 23 having been notified. Anthrax notifications, which number 21, were only half the number for 1930 (43), and notifications of epitheliomatous ulceration (65 as against 95) were also distinctly lower.

Aniline poisoning cases, on the other hand, showed an increase from 24 to 30, and toxic jaundice, of which there had been no cases in 1930, provided 7, due to arseniuretted hydrogen, in 1931. The most frequent cause of aniline poisoning, according to the report, is absorption through the skin, and the

essentials in prevention are better protective clothing and prompt action in the case of emergencies, e.g., the result of splashing.

The great bulk of notified cases of chrome ulceration occurred among persons engaged in chrome plating, but as regulations for the processes are now in force it is probable that a reduction in numbers will occur. A number of instances are quoted in the report to show the seriousness of the risk from chromic acid in fume or liquid form. Epitheliomatous ulceration, as always, found mineral oil the commonest causative agent, more particularly in cotton mule spinning. Special attention is directed to the risks of cancer of the bladder among chemical workers employed for any length of time in the manufacture of synthetic dyes.

Very special reference is made to the subject of dermatitis, and it is shown that despite the use of preventives, as alkaline antiseptic washes in the case of oils, and ointments where chromic acid and its salts are concerned, the condition is still very common. Among causative agents, alkalies, specially soda and lime, are still the chief, with sugar, oil and dyes some distance behind. Dust and fumes and gases come in for detailed reference, silicosis and asbestosis receiving special mention under the former head, and under the latter cases of acetone poisoning.

Discussing industrial illnesses generally, Dr. Bridge draws attention to a fact very commonly lost sight of—that while there may be a relation between industry and ill-health, manual work undoubtedly does exercise definitely beneficial effects on mind and body. To an extent what happens so far as this is concerned depends upon whether or not the individual is interested in his task, and as Dr. Bridge puts it: "The uninterested worker is an industrial invalid. Interest in work leads to industrial good health."

### THE FATHER OF THE ENGLISH HEALTH SERVICE

BY the death of Professor A. Bostock Hill, formerly Medical Officer of Health of the County of Warwick, and for long known as the "father of the public health service," that service has suffered a severe blow. Though he retired from office many years ago, he kept up his association with and interest in public health and preventive medicine, and despite his advanced age (he was 78 at the time of his death), up to within a few weeks of the end he had attended meetings of the Royal Sanitary Institute and other bodies with which he was connected, and which relied to an extraordinary extent upon him for wise advice and guidance. He was a clear thinker, a fine debator, and had wonderfully sound judgment. Among his other activities he had been Professor of Public Health in the University of Birmingham, and was held in great affection and esteem by many others than the large numbers occupying positions of importance who proudly claimed him as their teacher.

### HEALTH WORK IN LONDON

THERE are many Londons on both sides of the Atlantic, but only one, I think, that has a population of 4,363,800 and is regarded as one of the world capital cities. For these reasons such facts as are published in the annual report on public health of Sir Frederick Menzies, the County Medical Officer of Health, are of something more than mere local interest. The population mentioned is that estimated to the middle of 1931. Actually, as revealed at the census, the population of London is falling, due mainly to movement of Londoners to districts outside the metropolitan area. The birth rate, of course, is falling, that of 1931—15.0 per 1,000—being the lowest on record.

In 1931, deaths were more numerous than in the previous year, almost en-

tirely due to influenza, and respiratory and heart diseases associated with influenza. Special note is made of the tendency shown to a decrease in deaths due to street accidents. In relation to infectious diseases, the occurrence of decreases in certain cases is also noted. Smallpox—mild type—notifications, for example, fell from 5,149 to 1,452. Of actual cases of infantile paralysis, 51 were notified. The deaths numbered 6.

The 1931–1932 measles epidemic was less severe than that of 1929–1930. The deaths in 1931 numbered 115 as compared with 1,027 in 1930. In diphtheria notifications there was a marked reduction also, from 13,411 in 1930 to 8,384 in 1931. Notifications of fevers of the enteric group were 186 as against 291 in 1930. There were 24 deaths, the lowest number ever recorded in London from this cause.

Influenza was prevalent, the deaths numbering 1,121, the figure for 1930 being 366. The epidemic continued into 1932, the deaths in the second week in that year totalling 145. Rheumatic fever deaths were fewer, while those from cancer continued to show an increase: from 6,908 in 1930 to 7,159 in 1931.

The position in relation to tuberculosis in the metropolis is very fully examined in the report. The number of primary notifications (7,732) is down, and the death rate both from the pulmonary form (0.90 per 1,000) and the non-pulmonary (0.13 per 1,000) continues to decline. At the end of 1931 the number of cases of pulmonary tuberculosis on the registers was 29,565 (16,795 males and 12,770 females), and of other forms 11,060 (5,759 males and 5,301 females). Special note is made of the increased mortality from pulmonary tuberculosis among young women. This subject was one of those discussed at the Annual Conference on Tuberculosis this year, to which, I believe, I have already

made reference. The total number of cases receiving institutional treatment was 4,872, 3,218 passing direct to sanatoria or hospitals, and 1,654 to "observation" beds. The results of treatment are analyzed carefully and exhaustively, and appear to be satisfactory. Note is made of the fact that provision is made for London cases at Papworth Village Settlement.

There is reference also to a scheme, which apparently works well, under which a certain number of tuberculous youths receive special training in gardening with a view to their subse-

quent employment in the parks department. The scheme is working well, the boys so far selected giving satisfaction and benefiting greatly.

The report contains much most valuable information with regard to work done under the venereal disease scheme also, and in relation to blind persons, mental defectives, etc., all showing the vast extent of the ground covered and the thoroughness with which the various health activities of the county council are carried out.

CHARLES PORTER, M.D.

London

## ASSOCIATION NEWS

### NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

#### *Health Officers Section*

Ellis K. Devitt, M.D., Old Lyme, Conn.,  
Health Officer  
Clarence E. Lewis, M.D., Madison, W. Va.,  
Boone County Health Officer  
John H. McLaughlin, M.D., 37 Main St.,  
Jewett City, Conn., Health Officer  
William A. Meyers, M.D., 409 W. Main,  
Norman, Okla., Physician, State Bureau of  
Maternity and Infancy  
William A. Powell, M.D., Box K, Martinez,  
Calif., Health Officer, Contra Costa County  
Gradie R. Rowntree, M.D., Columbia, Ky.,  
County Health Officer, Adair County  
Cyrus J. Shelton, R. F. D. No. 2, Seymour,  
Conn., Health Officer of Oxford  
Deering G. Smith, M.D., 77 Main St., Nashua,  
N. H., Chairman, Board of Health  
Charles A. Wathen, M.D., McKee, Ky., County  
Health Officer

#### *Laboratory Section*

John R. Fitzgerald, 429 N. Main Ave.,  
Scranton, Pa., Laboratory Director, Wood-  
lawn Dairy Co., Chairman, Family Welfare  
Case Committee  
Arnold J. Gelarie, M.D., 52 W. 74 St., New  
York, N. Y. (Assoc.)

#### *Vital Statistics Section*

G. Arthur Blakeslee, 3919 John R., Detroit,  
Mich., Director, Bureau of Vital Statistics,  
State Department of Health

#### *Public Health Engineering Section*

Jose Luis Escario, Duque de Liria 6, Madrid,  
Spain, Chief Engineer, Sewage Treatment  
Plant of Madrid (Assoc.)  
Henry L. Morency, M.D.V., Temple Bldg.,  
Boulder, Colo., City Health Officer  
Cesar M. Opisso, Gerona, 18 Barcelona, Spain,  
Consulting Engineer of Sanitary Works  
(Assoc.)  
Clarence S. Timanus, 406 Interstate Bldg.,  
Kansas City, Mo., Consulting Sanitary  
Engineer  
Charles T. Wright, B.S., U.S.P.H.S., Cincin-  
nati, O., Sanitary Engineer

#### *Food and Nutrition Section*

Bernice Wait, Ph.D., Department of Home  
Economics, Experiment Station, Amherst,  
Mass., Research Worker in Nutrition

#### *Child Hygiene Section*

Paul S. Barrett, M.D., Department of Health,  
San Francisco, Calif., Director, Bureau of  
Child Hygiene

Ella Oppenheimer, M.D., Children's Bureau,  
U. S. Dept. of Labor, Washington, D. C.,  
Specialist in Child Hygiene

#### *Public Health Nursing Section*

Helen L. Felkner, R.N., Ostrander, O., Field  
Representative, State Department of Health  
Inez Gilliland, R.N., 27 Berkley Place, Colum-  
bus, O., Field Representative, State Dept.  
of Health

Harriet B. Luce, R.N., 11-D W. Weber Road,  
Columbus, O., Field Representative, Bureau  
of Local Health Administration

Olive B. Sheldon, R.N., 1222 Washtenaw Ave.,  
Ann Arbor, Mich., formerly Teaching Super-  
visor, Out-Patient Dept., Battle Creek  
Sanitarium

#### *Public Health Education Section*

Norman L. Burnette, 180 Wellington St.,  
Ottawa, Ont., Canada, Charge, Welfare  
Division, Metropolitan Life Insurance  
Company

Katharine R. Dutting, R.N., 70 Dubois St.,  
Newburgh, N. Y., Executive Secretary,  
Newburgh Public Health and Tuberculosis  
Association

Jane S. Kennedy, R.N., 222 E. Pittsburgh St.,  
Greensburg, Pa., Executive Secretary,  
Westmoreland Public Health Association

A. B. Kuhl, Jr., M.D., Board of Health,  
Davenport, Ia., Director

Hugh R. Leavell, M.D., 1022 Heyburn Bldg.,  
Louisville, Ky., College Physician, Uni-  
versity of Louisville

#### *Epidemiology Section*

Dr. George A. Sloan, 323 Narberth Ave.,  
Narberth, Pa., President, Board of Health  
Daniel M. Vail, 257 Suydam St., New Bruns-  
wick, N. J., Municipal and Sanitary  
Engineer

#### *Unaffiliated*

John A. Kienle, Mathieson Alkali Works, Inc.,  
250 Park Ave., New York, N. Y., Engineer  
Viola Weslock, 948 Greene Ave., Brooklyn,  
N. Y. (Assoc.)

#### DECEASED MEMBERS

W. D. Beacham, M.D., Hattiesburg Miss.,  
Elected Member 1919

Menno Hostetler, M.D., Wichita, Kans.,  
Elected Member 1930

Samuel Igllick, M.D., Orland, Calif., Elected  
Member 1931

Emma S. Lake, Greensburg, Pa., Elected  
Member 1924

John E. Monger, M.D., Columbus, O.,  
Elected Member 1923, Fellow 1926,  
Honorary Fellow 1932

Morris Knowles, Pittsburgh, Pa., Elected  
Member 1901, Fellow 1923

#### YEAR BOOK

The Year Book for 1932-1933 will  
not be published as a separate volume,  
but will be included as a supplement to  
an early issue of the JOURNAL, thereby  
being made available to every member  
or subscriber without extra cost.

#### SOUTHERN BRANCH ORGANIZED

AT the initial meeting of the Southern  
Branch A.P.H.A. in Birmingham,  
Ala., November 14-16, a Constitution  
and By-laws were adopted and officers  
elected as follows:

*President*—E. L. Bishop, M.D., Nashville,  
Tenn.

*First Vice-President*—J. H. Mason Knox,  
M.D., Baltimore, Md.

*Second Vice-President*—J. D. Dowling,  
M.D. Birmingham, Ala.

*Third Vice-President*—Margaret L. East,  
R.N., Louisville, Ky.

*Secretary-Treasurer*—R. H. White, Ph.D.,  
Nashville, Tenn.

*Acting Secretary*—Dorothy C. Cunningham.

*Representative on Governing Council*—F. J.  
Underwood, M.D., Jackson, Miss.

Although active membership in the  
Southern Branch is limited to full-time  
health workers who are members of the  
A.P.H.A., provision will be made for  
an affiliated membership class, com-  
posed of part-time health workers.

Dr. Kendall Emerson, Acting Execu-  
tive Secretary of the A.P.H.A., at this  
meeting, welcomed the Southern Branch  
to affiliation with the parent organiza-  
tion, and expressed the belief that the  
solidarity that would develop among  
public health workers in the south  
as a result of this organization, would  
have a strengthening influence for the  
A.P.H.A.

# PUBLIC HEALTH ADMINISTRATION

## EARLY DIAGNOSIS OF TUBERCULOSIS AMONG CHILDREN

ELTON G. LITTELL, M.D.

*Medical Director, Board of Education, Yonkers, N. Y.*

THE campaign of tuberculin testing, with X-ray examination of the reactors, has been of value in what it has disclosed, and also as an example of community coöperation. A more satisfactory coördination of the activities of so large a number of individuals and of groups is difficult to imagine.

The Academy of Medicine gave its endorsement of the project, then held two meetings devoted to the subject of childhood tuberculosis, having specialists as speakers and parents, school teachers, and other lay persons as its guests. It later donated \$150 for completing the taking of the X-ray films.

The Board of Education gave its approval of the work; the principals, teachers, nurses, supervisor of nutrition, registrars, students, and school physicians administered and carried out the many details of the project.

The Department of Health supplied the tuberculin; the Yonkers Tuberculosis and Health Association conducted a splendid educational work and financed most of the X-rays; two of the hospitals reduced materially the cost of the X-ray films and donated the services of the directors of the X-ray departments in taking and reading the films; the newspapers and radio station WCOH also aided in laying a foundation for this work. This foundation was in the process of building for over a year before the actual testing was begun—a community educational program being essential to the success of an

undertaking of this nature. Letters of information were then sent to the parents by the principals with details of the testing program and included a form to be signed by the parents requesting the test, and X-ray if necessary, and giving authority to report the findings to the family physician.

After the tests, parents were notified of the results, whether positive or negative, with suggestions for the future to those who did not react to the tests and with X-ray appointments for those who did react. The parents were notified too of the X-ray findings. If the X-rays were negative, parents were urged to have other X-rays taken at appropriate intervals. With positive X-rays, the patients were urged to keep in touch with the family physician, who was also notified of the X-ray diagnosis, at what hospital the film might be seen,

### TUBERCULIN SKIN TESTS

	Hawthorne Junior	Roosevelt Senior
Number made	436	501
Negative	320	326
Positive Skin Reactions		
1st degree	101	140
2nd degree	11	32
3rd degree	4	3
	116	175
Ages of Positive Skin Reactors		
11 to 12 years	7	..
12 to 14 years	65	50
15 to 16 years	41	100
17 to 20 years	3	25
Per cent positive	26.6	34.9



## X-RAYS OF THE CHEST

	Hawthorne Junior	Roosevelt Senior
Number taken	113	174
Signs of tuberculosis	19	14
Per cent of positive		
X-rays of those showing reactions	.16	.08
Details of X-rays		
Tracheo - bronchial lymph nodes	12	6
Root tuberculosis	3	6
Primary nodules in lungs	4	2

## FAMILY HISTORIES OF THOSE HAVING POSITIVE X-RAYS OF THE LUNGS

	Hawthorne Junior	Roosevelt Senior
Families with history of tuberculosis	7	8
Known cases of tuberculosis in these families	11	10
Known deaths from tuberculosis in these families	7	7

and that the patient was referred back to him for his care.

Old tuberculin, 1:1,000 solution, 1/10 c.c. was used.

No reaction other than the local skin reactions was discovered in any of the 937 tests.

## SUMMARY

Of the families of the 33 pupils with positive X-rays of the chest, 15 (45 per cent) gave a family history of active

lung tuberculosis. In the 15 families who gave a history of tuberculosis, there were 21 known cases of tuberculosis of the lungs and 14 known deaths from lung tuberculosis.

## CONCLUSIONS

*The demonstration suggests:*

1. That a smaller number of skin reactors is found among the younger pupils who have lived fewer years and so have had fewer contacts with tuberculous patients.

2. That although the skin reactors among the younger pupils are fewer in number, a larger percentage of X-rays among them was positive—suggesting that earlier infection is more apt to appear in the chest. This may be influenced, however, by the fact that the neighborhood of the junior high school has had a much larger number of deaths from tuberculosis each year than the neighborhood of the senior high school.

*The demonstration proves:*

That the X-ray is a discoverer of otherwise hidden tuberculosis; that the tuberculin test is an inexpensive method of discovering those who ought to have the X-ray films; and that it would be wise to test all children, especially those of the high school age and those who are known to be in contact with cases of tuberculosis.

## HEALTH DEPARTMENT REPORTS

Tennessee—One of the most comprehensive health department reports published in 1932 is that of the State Department of Health of Tennessee for the period 1929-1931. In general, mortality records indicate that the state suffered relatively more from infectious diseases and less from organic diseases of old age than the United States as a whole. The tuberculosis death rate at the end of the biennium was only three-fifths as high as that of 12 years ago;

in 1929, the rate was 120 per 100,000 population.

Syphilis, if its effects could be accurately measured, might compete with tuberculosis as a cause of sickness and death. Actually, it disguises itself in so many ways, and contributes to the development of so many different symptoms or diseases, that the mere statistics of deaths attributed directly to syphilis give no idea of its prevalence and importance. Recent examinations of a large number of persons confirmed the common impression that syphilitic infection is particularly widespread in the negro population.

The basic objective of the state department is to bring the whole population under effective full-time local health service and to provide in the central organization only such services and facilities as local health departments cannot provide for themselves. In addition, the department attempts to equalize the opportunity for local health service as between the several sections of the state,

. . . for in no other public activity is the interdependence of all sections so absolutely complete. Not only does one citizen deserve as much protection as another, but disease recognizes no political boundaries.

A small, compact, well trained central staff has been recruited and developed in order that expert service can be made available to any and all local departments. The state department consists of central administration and four divisions: Vital Statistics, Sanitary Engineering, Preventable Diseases, and Laboratories. Nearly 85 per cent of the appropriation goes either for state aid of all classes or for professional services.

More than half the rural population of the state is under the protection of full-time local health work. By the end of last year, 70,500 homes had been equipped with sanitary methods for the disposal of body wastes, and 526,000 children were given medical inspection in school hygiene work. Physical defects corrected rose from 18,000 in 1925-1926 to 49,800 in 1929-1930. During the year, 53,233 immunizations were given for diphtheria, 53,121 for smallpox, and 168,208 for typhoid fever.

**Los Angeles County, Calif.**—The annual report of over 200 pages, mimeographed, is made attractive by an ingenious cover design, instructive charts and tables, with descriptive text. Expenditures for the year ending June 30, 1932, were 10.5 per cent less than the previous year, although the eco-

nomic depression resulted in an increase in case loads of the health center clinics. There was no epidemic of serious nature. The Health Officer estimates that public health activity in the county since 1920 has, through reduced cases and deaths, saved a financial outlay of \$45,000,000. Diphtheria, as an illustration, has been reduced from a death rate of 15.9 to 2 per 100,000 population, besides a 25 per cent decrease in cases. The infant mortality rate in 1920 was 130, as contrasted with 39 for the past year.

Several unit cost studies were made of the inspection and other activities, leading to increased efficiency in administration. The net per capita cost of health department services for the 12 months was \$1.25, including medical social service and emergency treatment clinics. These costs are analyzed in considerable detail by functions by the business manager of the department.

During the year, treatment clinics for the indigent sick were transferred to the general hospital administration. This change has necessitated careful studies of medical social service work in connection with the admission and follow-up of cases as well as in the education of the community. The county health department has exercised an important influence in the community for use by the School of Social Welfare of the University of California; it has three representatives on the Council of Social Agencies; and provided the Chairman of the health section of the State Conference of Social Work. Many public addresses on public health and medical social work were given by staff members.

In the maternity and child hygiene field, 3,722 child hygiene conferences were held, with 7,560 cases registered as having made 36,335 visits. Over 500 infants were referred to private physicians for medical advice and 439 to clinical services.

It is noticeable that in 1923 the chief cause of infant deaths was diarrhea and enteritis, whereas in 1931 the chief cause has shifted to congenital causes, thus indicating where intensive preventive work is still needed to reduce further the infant mortality rate.

In the county health department laboratory, during the past 10 years, there has been an annual average of 104 examinations per 1,000 population, at an average cost per test of \$.38. During the past year the laboratory personnel numbered 18 per 100,000 tests.

New York State—The annual report for 1931 indicates that the appropriation for state aid to counties during the year amounted to \$336,043; of this \$191,197 was for half the expenditures of county health departments. In addition, \$134,874 was appropriated for public health nurses, traveling and incidental clinic expenses, \$14,125 for sanitary inspection, and \$21,246 for hospitals, preventoria and health camps owned and operated by county governments. Forty-three counties received help in amounts varying from \$825 in Oswego to \$113,310 in Westchester County. In accordance with the State Education Law, state aid of \$417,504 was given for the rehabilitation of crippled and handicapped children.

Some of the measures taken by the

State Department of Health to combat the poliomyelitis epidemic, which started early in August, were:

1. Collection of an adequate supply of human blood serum from recovered cases
2. Establishment of emergency laboratory facilities
3. Appointment of competent local consultants on a fee basis to be available on call of physicians to assist them to make clinical and laboratory diagnosis at the bedside and to administer serum
4. Restriction of the use of poliomyelitis immune serum, as far as possible, to cases in the preparalytic stage
5. Provision for additional full-time epidemiologists as temporary assistants to district state health officers
6. Furnishing of information to the medical profession and the public generally of facts concerning this disease and of the availability of clinical and laboratory aids in diagnosis and treatment
7. Employment of additional nurses to render immediate assistance and to provide the necessary after-care

A follow-up survey is being made of all cases of poliomyelitis in districts where it has been especially prevalent during the epidemic.

The purpose of the survey is to determine, in so far as may be practicable and possible, the extent to which poliomyelitis immune serum administered in the preparalytic stage was of benefit; also, to ascertain in cases with neuromuscular involvement, their classification and the extent of paralysis.

# LABORATORY

## A YEAST EXTRACT MEDIUM FOR DETERMINING THE BACTERIAL CONTENT OF MILK BY THE PLATE METHOD \*

E. D. DEVEREUX AND J. L. ETHELLES

*Michigan Agricultural Experiment Station, East Lansing, Mich.*

IN bacteriological routine plate counting of milk, water, and other food products, the main purposes of a standard medium for cultivating the organisms are to obtain a fairly accurate qualitative and quantitative estimate of the bacterial content of the food and to obtain data that will be comparable to other data obtained in the same laboratory or other laboratories. These so-called standard media, or standard tests, are constantly subject to attack from the points of accuracy, simplicity of preparation or use, cost, and time consumed. It is largely with the latter point that this paper is to deal.

In recent articles by the senior author,<sup>1, 2</sup> a yeast extract medium was described which proved to be excellent for the cultivation of organisms occurring in milk, the medium being used either in the liquid or solid form. Preliminary experiments revealed the fact that this medium compared very favorably to plain nutrient agar in determining routine plate counts of milk using the technic prescribed by the *Standard Methods of Milk Analysis*.

### EXPERIMENTAL

This medium differs from plain nutrient agar in that yeast extract and peptonized milk are substituted for

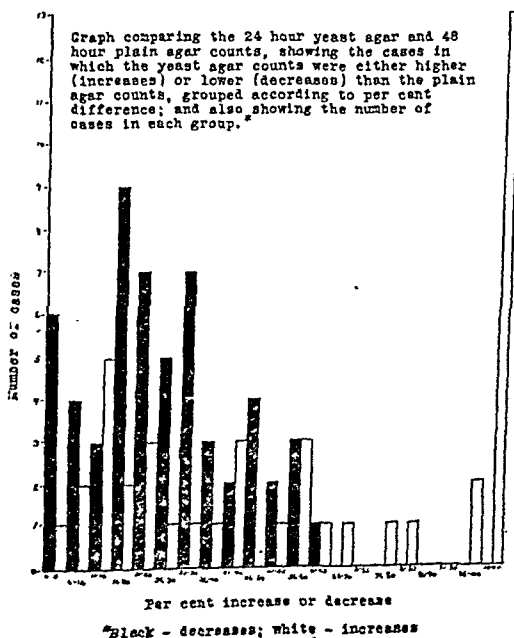
meat extract and peptone, and dextrose is added.

### FORMULA OF YEAST EXTRACT AGAR

Yeast extract (Difco) .....	5. grams
Peptonized Milk (Difco) .....	10 grams
Salt .....	5 grams
Dextrose .....	10 grams
Agar .....	15 grams
Distilled water .....	1,000 c.c.

Adjusted to pH 7 and autoclaved at 15 lb. for 15 minutes.

One hundred samples of raw milk were plated according to the method as described by the A.P.H.A. *Standard Methods for Milk Analysis*. One set of counts was obtained by using



\* Journal Article No. 121 (n.s.) from the Michigan Agricultural Experiment Station.

Standard Methods plain nutrient agar, and a duplicate set was obtained using the yeast agar mentioned above. The same dilution flasks were used to prepare both sets of plates in order to eliminate errors that might occur in preparing two sets of dilution flasks. The plates were incubated at 37° C. and counts were made at the end of 24 and 48 hours, the plates being removed from the incubator only long enough to make the counts.

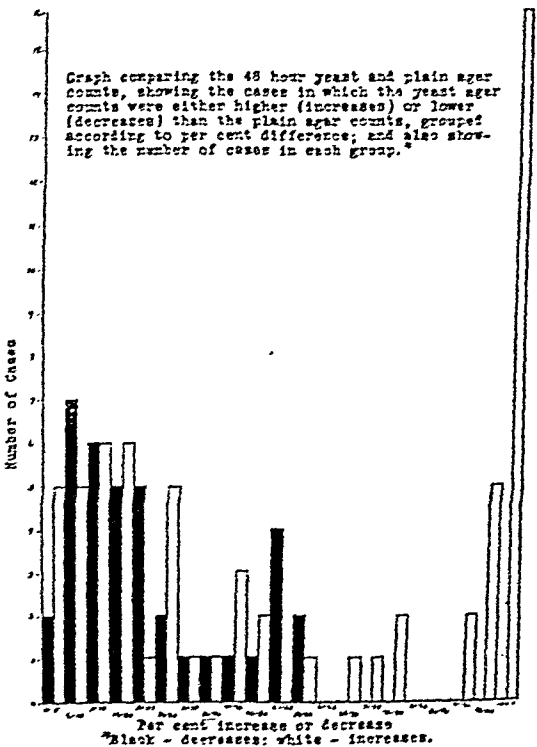
TABLE I—SUMMARY OF DATA

Summary	24-hr. yeast agar count compared to 48-hr. plain agar count	48-hr. yeast agar count compared to 48-hr. plain agar count
	Per cent	Per cent
Cases showing higher yeast extract agar count . . . . .	42	60
Cases showing lower yeast extract agar count . . . . .	56	37
Cases showing same yeast extract agar count . . . . .	2	3
Maximum increase in yeast extract agar count . . . . .	320	470
Minimum increase in yeast extract agar count . . . . .	5	1
Maximum decrease in yeast extract agar count . . . . .	64	59
Minimum decrease in yeast extract agar count . . . . .	1	1
In those cases where yeast agar counts were higher; average increase . . . . .	78	84
In those cases where yeast agar counts were lower; average decrease . . . . .	27	23
All cases considered; average difference (increase) in yeast agar count . . . . .	18	45

RESULTS

From the data obtained comparisons were made of the counts obtained in 24 and 48 hours on the yeast agar and the 48 hour plain agar counts.

A summary of the data is given in Table I, while in the bar graphs are given the cases in which the yeast agar counts were either higher (increases) or lower (decreases) than the plain agar counts, grouped according to per cent difference; and also the number of cases in each group. Averages of the data given in the graphs are presented in the table as the second and third items from the bottom. In the graphs it will be noted that the majority of the cases of lower yeast agar counts (decreases) are in the region of relatively low percentages. Although the cases of higher yeast agar counts (increases) extend entirely across the graphs there is, in each graph, a rapid rise in the region of relatively higher percentages where no decreases ever occurred. There were two cases in which the yeast agar counts, both the 24- and 48-hour sets, were 29 and 166 times the 48-hour plain



agar counts. These cases were not used in calculating the data for the table; however, in no other cases were the data withheld.

Returning to the table, it will also be noted that when the results of all the samples were considered the yeast agar gave counts in 24 and 48 hours which were on the average 18 and 45 per cent, respectively, higher than the 48-hour plain agar counts. This brings out at least two points, namely: that yeast agar counts made at the end of 24 hours will on the average be comparable to plain agar counts at the end of 48 hours, thus resulting in a saving of 24 hours; and 48-hour yeast agar counts will on the average be appreciably higher than similarly made plain agar counts. The types or organisms which appeared on the two media were essentially the same, the difference being that

the yeast agar promoted a more rapid growth of all the organisms.

#### SUMMARY

A yeast extract agar medium was described and when used for determining the bacterial content of milk by the plate method gave counts at the end of 24 hours' incubation which were on the average comparable to plain nutrient agar counts made at the end of 48 hours, resulting in a saving of 24 hours for the completion of the test. Also it gave counts at the end of 48 hours which were on the average 45 per cent higher than similarly made plain agar counts.

#### REFERENCES

- Devereux, E. D. A Yeast Extract Medium for the Examination of Milk. *A. J. P. H.*, 22, 12:1293 (Dec.), 1932.  
Devereux, E. D. The Application of a Yeast Extract Medium to a Test for Determining Quality of Milk. *A. J. P. H.*, 22, 12:1291 (Dec.), 1932.

## VITAL STATISTICS

Plague in British India, 1896-1931  
—Plague entered British India through Bombay in 1896, and rapidly secured a foothold throughout the whole Presidency; by 1902 it had spread to the Punjab, and a little later the United Provinces were involved. The incidence of the disease was at its worst in 1907, when no less than 1,160,000 inhabitants of this country died as a result of it. But since that year, there has been an almost continuous decline in the death rate, and some sanitarians believe that the disease, as an endemic infection, will soon cease to occur in India altogether. The reasons for this progressive reduction in the number of attacks are obscure, but appear to be connected with an immunity in some way acquired against the disease in this country by rats.

During the calendar year 1929, the total number of deaths from plague recorded throughout India amounted to no more than about 70,000, and the figures for the first quarter of 1930 were so satisfactory as to give reason for suggesting, in a previous report, that the depredations of the disease during 1930-1931 would be less than they had been for many years past. These anticipations were fulfilled. The customary seasonal rise in the mortality rate took place during the months of March and April, and the incidence of plague was for a time rather severe in the Eastern Districts of the United Provinces and in the Belgaum and Dharwar Districts of the Bombay Presidency; but despite this, the total number of deaths reported during the year was only slightly over 20,000, which

is the lowest figure reached since 1898—the year immediately following that in which plague was introduced into India. The improvement was most pronounced in the Punjab and the Western portion of the United Provinces.—Calcutta: Government of India. Central Publication Branch, 1932, *India in 1930-1931*. p. 418.

**The Diabetes Record of 1931—**Diabetes, regardless of the insulin treatment and other advances of medicine, continues to increase. The diabetes death rate of 50 American cities, which in 1931 had a combined population of about 31,000,000, increased from 15.9 per 100,000 in 1912 to 24.6 in 1931. This is the highest rate which has ever been recorded for this country. The actual number of deaths in these cities increased from 6,890 in 1930 to 7,610 in 1931, or 9.1 per cent.

A study of the mortality from diabetes in 184 American cities in 1930 and 1931 shows increases in the latter year in 97 cities, decreases in 85, and the same rates for 1930 and 1931 in 2 cities. In 11 of these cities the rate exceeded 35 per 100,000, and in 6, it exceeded 45. The cities with rates above 45 in 1931 were Oak Park, Ill. (73.2); Atlantic City, N. J. (51.4); Madison, Wis. (46.5); New Haven, Conn. (45.5); Paterson, N. J. (45.4); and Syracuse, N. Y. (45.4). No satisfactory explanation of these excessive rates in particular localities has thus far been forthcoming. To some extent, of course, the rate is explained by admissions to local hospitals affording treatment to out-of-town residents, but this cannot account for more than a fraction of the extraordinary excess in the rate.

Equally puzzling are the low diabetes death rates for other localities. The 6 cities having rates of less than 5 per 100,000 were Greensboro, N. C.

(1.7); Hamtramck, Mich. (1.7); Flint, Mich. (3.0); Montgomery, Ala. (3.0); Pueblo, Colo. (3.9); and Medford, Mass. (4.8). Somewhere between these extremes must lie an explanation which as yet has not resulted in even extended local research. It is true, of course, that the low rates are mostly for comparatively small communities and possibly the result of accidental departures from normal.

Comparing 1931 with 1930 diabetes death rates in the 5 largest cities of the United States, it is noted that the rate increased from 23.9 to 27.4 in Chicago; from 25.6 to 27.1 in New York; and from 16.1 to 20.7 in Philadelphia. It remained the same (15.3) for both years in Detroit; and declined slightly—from 20.7 to 20.4 in Los Angeles. In the aggregate, these 5 cities had 3,413 deaths from diabetes in 1930, against 3,797 in 1931. There is, therefore, an actual increase in the mortality of about 11 per cent, practically corresponding to the observed increase in 50 cities and 184 cities combined.

For relative position, these American cities may be compared with 60 foreign cities, which, for 1930, show a range in rates from no deaths in Reykjavik, Iceland, to a rate of 29.5 per 100,000 for Colombo, Ceylon. Assuming a rate of 15 per 100,000 as fairly normal, there were 17 foreign cities with rates higher than 15, while the corresponding excess in 184 American cities is represented by 126 communities. Among the 60 foreign cities, only about 28 per cent showed rates above the assumed normal rate of 15, while among the 184 American cities, 68 per cent exceeded this rate. Among 14 Canadian cities, with an aggregate population of 1,875,922 in 1931 the death rate from diabetes was 12.4 in 1931, as compared with 11.4 for the same 14 cities in 1930. The rate of 12.4 for 14 Canadian cities is in striking contrast

to the 1931 rate of 22.7 for 184 United States cities with an aggregate population of 42,895,109.—Frederick L. Hoffman, *Diabetes Record of 1931. Spectator*, 129:7 (Nov. 24), 1932.

**Vital Statistics for Jamaica, 1931**—The estimated population of the Island of Jamaica on December 31, 1931, was 1,050,667; males 509,465 and females 541,202. There were 3,604 marriages registered during the year as compared with 4,188 in 1930, a decrease of 584. The marriage rate in 1931 was 3.4 per 1,000 population, while in 1930 it was 4.1.

Births on the island numbered 36,173 during 1931, 18,344 boys and 17,829 girls. The birth rate was 34.8 per 1,000 of population. In the preceding year, there were 37,340 births with a rate of 37.0. Of the 36,173 births in 1931, 25,958 or 71.76 of every 100 births registered were illegitimate. This rate is higher than the 1928, 1929 and 1930 rates of 71.46, 71.47 and 71.75, respectively, though not as high as the 1926 and 1927 rates of 73.37 and 72.65, respectively.

There were 19,377 deaths from all causes registered in Jamaica during 1931, 9,704 of males and 9,673 of females, the death rate for the year being 18.6 per 1,000 of population. In 1930 there were 17,214 deaths with a death rate of 17.0. The 1931 rate of 18.6 per 1,000 is higher than the 1930 rate of 17.0, which was Jamaica's lowest recorded rate since the commencement of death registration in 1878, and slightly higher also than the 1929 rate of 18.4. The infant mortality per 1,000 births on the Island was 153 in 1931, as against 141 in 1930, 160 in 1929, 157 in 1928, and 173 in 1927.

In view of the fact that 67 per cent of the deaths registered on the Island during 1931 were not medically certified as to cause of death, an analysis

of the principal causes of death would be of no significance. In the Parish of Kingston, however, certification is much better; here more than 85 per cent of the total deaths are medically certified by cause. Analysis of the principal causes of death in Kingston shows that tuberculosis, congenital debility, diarrhea and enteritis, diseases of the heart and pneumonia are by far the leading causes of death.—*Jamaica. Annual Report of the Registrar General's Department, 1931, 1-5.*

#### Low Death Rates in Autumn—

The people of the United States and Canada usually have the benefit of excellent health conditions in the final quarter of the year; and this is the experience of the current autumn, to date. The death rates from October to December are much more favorable as a rule than in winter or spring, and are only slightly higher than the minimum mortality which prevails, year after year, in summer. This has been the experience of the Metropolitan Life Insurance Company among its millions of white industrial policy holders for the past 5 autumns. The average autumn death rate in this insured group was 7.5 per 1,000, as against 9.3 for the winters of the same years, 8.4 for the springs, and 7.1 for the summers. The average autumn mortality rate has been only little higher than that for the summer, as contrasted with a large increase between autumn and winter. In spring, the mortality rate improves over the winter figure due, largely, to a seasonal drop in deaths from respiratory diseases. But the spring death rate, nevertheless, is much higher than that for the autumn months.

Each individual cause of death has its own season of maximum and minimum incidence. Typhoid fever, diphtheria, alcoholism and automobile fatalities are the only ones of all the causes that show



their maximum mortality rates in autumn; and, in fact, the autumn diphtheria and alcoholism death rates for the 5-year period 1928-1932 were duplicated in the winter months. The average autumn death rate for automobile accidents was only slightly higher than the summer figure.

There are considerably fewer deaths from tuberculosis in the autumn and summer than in the other seasons. The average fall and summer death rates for this disease were less than 58 per 100,000 for the past 5 years, as against 68 and 69 in the winter and spring months respectively. The measles death rate is almost nil in the autumn, and deaths from whooping cough are also at their lowest point.

The seasonal incidence of suicide is of particular interest. In the wage earning group of the population, at least, the autumn death rate has been lower during the last 5 years, than that of any other season. For the population at large, it seems that the low point for suicide is reached during the winter season. One point is clear with respect to the white wage earning population, namely, that suicides are considerably more frequent during the spring than at any other season. The death rate reaches its peak, strange to say, in the month of May, which, many will agree is usually the pleasantest month of the year; and it is in the bleak months of December and January that people resort to self-murder least frequently.

Deaths of women from causes incidental to pregnancy and childbirth show a decided seasonal incidence. Among insured women, the autumn death rate for the 5-year period 1928-1932 was nearly 3 per cent lower than that for the summer season, more than 9 per cent lower than in the spring, and almost 16 per cent below that registered

for the winter.—*Stat. Bull. Metropolitan Life Insurance Co.* 13:5-6 (Nov.), 1932.

**Population of Japan, 1920-1925—**  
In 1925 the population of Japan proper was 59,736,822. This was an increase of 3,773,769 over 1920, the rate of increase being 67 per 1,000 for the 5-year period. The average density of the population in 1925 was 156 per square km. compared with 147 in 1920. In 1925, there were 101 males to 100 females as compared with a ratio of 100.4 males to 100 females in 1920. In 1925 the portion of the population residing in cities of over 30,000 inhabitants comprised 21.6 per cent of the total. In the rural population there were 99.2 males to 100 females, while in the urban population there were 107.6 males for each 100 females. Native born Japanese comprised 997 out of each 1,000 of the total population; those born in oversea territories, 2 per 1,000; and the foreign born, only 1 per 1,000 of the total. The bulk of the 1925 population who were born in oversea territories were Koreans.

Infants under 1 year of age constituted the highest percentage of the total population. As age groups advanced thereafter, there was a noticeable decrease in the percentage of the population represented.

Agriculture was the source of employment for 14,128,360 persons; manufacturing industries employed 5,300,248; then commerce and finance were next with 3,188,002 persons employed. There were relatively fewer economically dependent persons in agriculture than in any other broad occupational group.—T. Hasegawa, *Bull. de l'Inst. Internat. de Stat.* 25(2):5-38, 1931; *Soc. Sci. Abstr.* 4:1672-1673 (Oct.), 1932.

# PUBLIC HEALTH ENGINEERING

## INCINERATION IN WASHINGTON \*

JOHN BLAKE GORDON

*Director of Sanitary Engineering, Engineer Department,  
District of Columbia, Washington, D. C.*

IN 1919 a privately owned rubbish salvage and incineration plant was constructed in Washington. Shortly after its construction prices for salvaged goods fell to a point at which no profit could be made and the District of Columbia took over the operation of the plant under a lease from the owners. Under municipal operation, the primary function of the salvage plant was to dispose of rubbish, but material salvaged reduced greatly the load on the furnaces. During this period of operation the plant was destroyed by fire and rebuilt, but the furnaces proved inadequate even under 24-hour operation to handle the rubbish collected by the District, not to mention that collected by private contractors, and it became necessary to dispose of all rubbish by burning on the available dumps.

At the Washington Airport dump, private parties are allowed to dump rubbish upon payment of a fee to the airport authorities of \$.50 a load. Material is deposited and picked over by a group of dump dwellers who at one time numbered over 200. This dump is fired whenever the wind is away from the city. Incidentally, a storm of protest from citizens associations and airport authorities, together with the anticipated completion of the two District incinerators, has resulted in an order

from the Arlington County Commissioners that this dump be discontinued.

Garbage reduction at the District owned plant at Cherry Hill, Va., about 25 miles south of Washington on the Potomac River, has proved entirely satisfactory, and during prosperous years has yielded considerable profit by the sale of grease and fertilizer. This fact, together with the unavoidable odors which experience at the garbage transfer station has indicated may be expected from the handling of this form of refuse, were the determining factors in the decision to make the proposed incinerators for rubbish and street sweepings only.

### HISTORY OF LEGISLATION

Accordingly, in 1922 an unsuccessful attempt was made to secure an appropriation from Congress for the construction of one or more incinerators and this attempt was repeated regularly until 1929 when an act was passed authorizing the expenditure of \$850,000 for "the acquisition of land in the District of Columbia and the construction thereon of two modern, high temperature incinerators for the destruction of combustible refuse."

The first appropriation, made March 26, 1930, included an item for the retention of the services of a consulting engineer, in which capacity the District considered itself very fortunate in retaining Harrison P. Eddy, of national reputation as an expert on incineration.

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

From this appropriation, sites approved by the National Capital Park and Planning Commission were acquired and, following a second appropriation of \$300,000, ten bids were received March 17, 1931, on the basis of designs to be furnished by the bidders. Following complaint of one of the bidders, the Comptroller General of the United States ruled that it was illegal to let a contract on this basis in spite of the fact that comprehensive specifications had been issued limiting the designs and fixing the capacities. It was therefore necessary to have the consulting engineer prepare detailed designs of the furnaces, buildings, and equipment so that all bids would be made on one design. Accordingly, new bids were requested and on December 8, 1931, 24 new proposals were received.

During this controversy, the appropriation had lapsed and contracts could not be let until funds had been reappropriated. This was done, however, and on February 3, 1932, contracts were awarded to the Rust Engineering Company of Pittsburgh for the construction of the O Street Incinerator at a cost of \$321,416, and to the North-Eastern Construction Company of New York and Baltimore for the construction of the Georgetown Incinerator at a cost of \$169,268. This represented a saving to the District of \$104,000 over the lowest previous conforming bids.

Extra orders for items such as water-cooled dampers, indicating pyrometers, and other mechanical and structural changes, as well as driveway paving done by the District, have increased the cost of the Southeast plant by approximately \$18,000 and of the Georgetown plant by approximately \$5,000. Time of completion was fixed at 270 days to the beginning of tests at O Street and 260 days at Georgetown, and both plants were completed well within the contract time.

#### CAPACITY OF PLANTS

The act of Congress authorizing this construction requires that the two plants shall have sufficient capacity to burn all "combustible rubbish and street sweepings" produced in the District of Columbia and also grants permission to certain Maryland and Virginia communities to dispose of their rubbish at these plants. Accordingly, the two plants were designed with a conservative rated capacity of 595 tons per 24-hour day, making no allowance for certain substantial areas of grate surface and perforated grate-surrounded castings which would materially increase the plant capacities. A distribution of 425 tons at O Street and 170 tons at Georgetown was made after an intensive study of collections within the various collection districts of the city in order to reduce to a minimum the length of hauls to the two plants.

#### MATERIAL TO BE BURNED

In general the rubbish to be burned is highly combustible. Nearly half of it is expected to be paper or materials made from paper, but there is a substantial portion which is incombustible, such as metal, glassware, and leather. When delivered to the furnaces, this material is very loosely packed and its combustion proceeds rapidly. In times of heavy rain, however, it will be very wet, and in all probability, auxiliary oil burners will have to be used. Leaves to be incinerated at certain times of the year may also be either dry, loosely packed and easy to burn, or they may have a moisture content equal to that of garbage. Street sweepings, other than leaves, heretofore used as filling material on the dumps will also be incinerated in these plants.

#### DESCRIPTION OF PLANTS

The buildings each have a low receiving room along one side and a high

main section, with a manifold flue out-of-doors connecting chimneys and furnaces. Provision is made at O Street for the future utilization of heat to provide power by the construction of boilers between the chimneys and the building proper.

Incoming trucks pass over weigh scales where weights are recorded before the trash is dumped into the receiving bins. These bins extend nearly the length of the buildings and have capacities of 50,000 cubic feet at O Street and of 25,000 at Georgetown, to provide sufficient storage capacity to operate full time. This storage is necessary, since collection is concentrated into 8-hour days, while the furnaces are operated 24 hours a day. It is not, however, intended to store material beyond a period of 1 day. Two cranes at the first named plant and one at the second handle the fuel from the bins into the charging hoppers on the charging floors and are rated to perform 35 definite duty cycles per hour at full load.

The charging hoppers have air operated gates which permit the stoker on the floor below to admit charges of 1 yard each to the furnaces at will. After combustion, the resultant ashes are automatically quenched and discharged through water-sealed ash gates, hydraulically operated, directly into trucks at Georgetown and into an ash car at O Street. This car in turn empties into a semi-automatic skip hoist which raises the ashes into a bin where they are temporarily stored until they are loaded into trucks for transportation to the dumps. Ashes from Georgetown will be used in filling low land at Foundry Branch just west of Georgetown University while the ashes from O Street will be used in the Anacostia Park development.

#### CONCLUSION

Official tests have been almost concluded at Georgetown and are about to be started at O Street. These tests so far indicate satisfactory construction and design and have shown that it will be possible to operate well within the estimated figure of \$2.40 per ton, a figure obtained by a survey of various plants of like nature in several eastern cities.

Just previous to the award of the contracts, a manufacturer complained to the Comptroller General of the United States that the designs prepared for the District excluded his equipment. The Comptroller General ruled that there was no legal basis for his complaint. Later it was claimed that these incinerators infringed a certain patent, but upon advice from the Corporation Council of the District, work proceeded on the construction, and as yet no further action has been taken.

Previous to construction, the work was under the direct control of Major D. A. Davison, then Assistant Engineer Commissioner. The actual construction was carried out under the general supervision of the Engineer Commissioner, Major John C. Gotwals, with direct control invested in Harrison P. Eddy, Jr., the consulting engineer, and A. B. Greene, the resident engineer.

NOTE: It should be noted that technical descriptions of these two incinerators have been purposely avoided as requiring more space than is available. A detailed description of the design and operation of the District incinerators was prepared by Harrison P. Eddy, Jr., of the firm of Metcalf and Eddy, Engineers, Boston, Mass., and was delivered by him before the Sanitary Engineering Division of the American Society of Civil Engineers at Atlantic City, October 6, 1932. Copies of this description have been prepared and may be obtained by those desiring them.

# A STUDY OF ZINC CONTENT OF CERTAIN WATERS AND ITS RELATION TO U. S. PUBLIC HEALTH SERVICE STANDARDS

THE United States Public Health Service has set a limit of 5 parts per million of zinc for waters used for drinking and culinary purposes. It has been found that there is an extremely wide variation in the solvent action on zinc of various waters. The degree of alkalinity, the amount of dissolved gases, oxygen and carbon dioxide, present in any given water will effect the rate of solution of zinc by said water. Zinc contamination, when existing, generally takes place within building limits. Zinc is seldom, if ever, present in water in street mains. Authentic cases of illness caused by

presence of zinc in water are a matter of record. The amount of zinc constituting a toxic dose, in water, is open to discussion. It is shown that the proper chemical conditioning of water will result in preventing solution of zinc. Fairhall's method for determination of zinc is recommended as being the most accurate method now available.—Abstract of paper presented by R. M. Palmer, Chemical Engineer, 500 Fifth Avenue, New York, N. Y., before the Public Health Engineering Section of the American Public Health Association at the 61st Annual Meeting in Washington, D. C., October 26, 1932.

## INDUSTRIAL HYGIENE

### Appointment of Occupational Health Council in Massachusetts—

An Advisory body to be known as the Occupational Health Council has been recently established in the Massachusetts Department of Labor and Industries. The council will be concerned with the occupational health problems of the state, the study of which has recently been inaugurated with the appointment of an occupational hygienist. The members of the council include prominent representatives of public health and industrial medical services, labor unions, employers' organizations, social and welfare organizations, and insurance companies.

The Commissioner of the Department said:

We propose to give ourselves the benefit of the best advice obtainable from individuals and institutions concerned with the health of the working population, and we believe it no less important that these interests be kept informed of the work which we are doing. I do not anticipate the need for frequent meetings of the group as a whole, but hope rather

for the counsel of its members as it is needed, their criticism as it is called for, and their support as it is merited.

With all regard for the pressing necessity of extreme economy in government, I am confident that this new undertaking of the department will more than justify itself in the reduction of disease arising from inadequately protected industrial occupations in the commonwealth.—

*Month. Labor Rev.*, U. S. Bureau of Labor Stat., 35, 3:541 (Sept.), 1932.

Death of Magnus Washington Alexander—Industrial hygienists will greatly regret the death of Magnus W. Alexander, an engineer by training, organizer and noted guide of the National Industrial Conference Board, which has published many important researches in industrial medicine, some in monograph form. He had headed the board since its organization in 1916.

Although born in New York, he obtained most of his schooling in Austria. Returning to America in 1893, he progressed steadily until he became engineer in charge of designing for the

General Electric Company, and, in 1918, became that company's consulting engineer on economic issues. He will be especially remembered for his comprehension of the importance of industrial safety and hygiene and his influence in promoting medical organization. Memorial articles may be found in the Sept. 20, 1932, issue of the *Conference Board Bulletin* (247 Park Avenue, New York). E. R. H.

**The Dust Hazard in Air-Pressure Abrasive Blasting (Sandblasting)**  
—Object of the Investigation: The investigation here reported was made for the Committee on Health Protection in Air-Pressure Abrasive Blasting of the National Safety Council, of which the senior author was chairman. It was a coöperative study in which the U. S. Public Health Service coöperated with the Council. The actual field surveys and analytical work were performed by Leonard Greenburg and J. J. Bloomfield.

The object of the investigation was to determine the actual extent of the dust hazard in air-pressure abrasive blasting as conducted under American industrial conditions, to discover what protective measures were in use and to estimate their efficiency.

Air-pressure abrasive blasting is employed in two fundamentally different ways—in sandblast rooms, where the worker must operate by hand, in the midst of the sandblast atmosphere; and by the use of barrels, tables and cabinets in which the castings are exposed to the sandblast in a closed chamber, with the worker operating outside.

When such work is conducted in closed devices employing sand as the abrasive, the air of the workroom generally contains a highly hazardous dust concentration—over 90 per cent of quartz, and an average count of over 20 million particles per cu. ft. When

steel instead of sand is used, the quartz content falls to 3 per cent and the dust counts average from 8 to 15 million particles—a condition which should not cause silicosis. Studies show, however, that all four types of equipment investigated can be made safe by proper construction and maintenance.

In rooms, where the worker must operate in the actual midst of the sand blast, the dust content is, of course, enormous, averaging 155 million particles per cu. ft. with steel abrasive, and 969 million with sand abrasive.

Helmets depending on filtration are quite inadequate to protect the worker against such dust concentrations; and positive air-pressure helmets with wire mesh eye-screens are irregular and unreliable in their effect.

On the other hand, positive air-pressure helmets with glass eye-shields and an air supply of 6 cu. ft. per minute furnish complete protection to the worker under the worst conditions found in actual operation, yielding a dust content of less than 1 million particles per cu. ft. within the helmet, with 1,000.0 million or more particles per cu. ft. in the outside air and rising only to 3 million particles per cu. ft. within the helmet even when the outside air contains 4,000.0 million particles.—

Leonard Greenburg and C.-E. A. Winslow, *Arch. f. Gewerbepath. u. Gewerbehyg.*, 3, 4:577-599, 1932.

E. R. H.

**Physiological Factors in Mine Ventilation in 1931**—The hazards connected with work under abnormal air conditions are becoming of increasing importance from a financial as well as a physiological standpoint, due to the extension of compensation laws to include diseases caused by dusts, toxic gases, and abnormal temperatures and humidities.

The United States, with the exception of California, North Dakota, Wisconsin, Massachusetts, and Connecticut, is the only English-speaking country where silicosis is not compensated.

A summary of recent literature concerning effects on workers of exposure

to dusts is taken up in alphabetical order of countries—Australia, Austria, Canada, England, Germany, Italy, The Netherlands and the United States. In England and the United States especially there was much literature on the subject of silicosis (pp. 2–35).

A summary of recent literature on effects of toxic or noxious gases is next included by leading countries, with special reference to the United States (pp. 35–51). Abnormal temperatures and humidities follow, also by countries (pp. 51–66).—R. R. Sayers, U. S. Bureau of Mines, *Inf. Circular*, 6645, Sept., 1932 (mimeographed). E. R. H.

**Compensation for Industrial Diseases—Prague**—A law for compensation of industrial diseases became effective July 1. Workmen's compensation for accidents, however, has existed in Czechoslovakia since 1887. There are 25 diseases now on the list, and the government may add others. In addition to the usual industrial poisons (lead, phosphorus, mercury, arsenic, manganese, benzene, carbon sulphide, carbon hydrogen, phosgene, carbon monoxide, hydrocyanic acid), a number of chemical substances, chiefly tar-products are enumerated that cause chronic eczemas and malignant growths of the skin. X-rays and radiums are also included. The list likewise contains cancer of the lungs, so frequently found in the mines of Joachimsthal. Infectious diseases resulting from occupations are covered, especially anthrax, glanders, and hookworm.

Other diseases covered are chronic changes in the bones and joints as the result of pneumatic drills and hammers. The most important group, however, is silicosis and siderosis. To this same group is added damage to the lungs by Thomas artificial fertilizer.

The last group comprises nystagmus and deafness as a result of working in mines. The accident insurance body

has the right also to give a temporary pension to a patient who is willing to change his occupation.—*J.A.M.A.* (Foreign Letters), 99, 20:1705 (Nov. 12), 1932. E. R. H.

**Department of Industrial Hygiene**—Studies on methods of dust estimation have been continued in association with the Miners' Phthisis Prevention Committee and the Mine Air Committee with a view of standardizing practice in the use of the dust counter (konimeter). The purpose is to secure a reasonable agreement. It is found necessary to treat the spots to be counted to remove water soluble particles and carbon in order to secure greater accuracy (in silica dust estimations). The possibilities of crucibles with filter floors of porous porcelain so that particles may be graded in terms of size-frequency is also being investigated.

In the Biochemical Department, the diet used by the mine natives has been investigated especially as regards its content in vitamin A. The livers were obtained from cases dying of pneumonia, and the amount of vitamin A was compared with that found in accident cases used as controls. The vitamin A content of the controls appeared to be quite definitely higher than that of the hospital group.—The South African Institute for Medical Research, *Annual Report Year ending December 31, 1931*, pp. 16–18. E. R. H.

**Facts on Child Labor**—Based on the 1930 Census returns, there were 667,118 child workers, 10–15 years, inclusive, or 4.7 per cent (1 in every 21) of the children of these ages in the United States. These figures included 431,790, or 9.2 per cent (1 in every 11) children, 14–15 years of age.

Of the gross number, 469,497, or 70.4 per cent, were employed in agriculture; 68,266, or 10.2 per cent, in

manufacturing and mechanical industries (textiles 20,625, clothing 8,650, building 7,380, lumber and furniture 4,790, food and allied industries 4,324, and iron and steel and other metals 3,236); trade 49,615 or 7.4 per cent; domestic and personal service 46,145 or 7 per cent; clerical occupations 16,803 or 2.5 per cent; transportation 8,717 or 1.3 per cent; extraction of minerals 1,184 or 0.2 per cent; and others 6,891 or 1 per cent. These figures include also those in public and professional service, forestry and fishing.

Eleven southern states (named) had from 5.5 to 24.9 per cent of their children, 10-15 years of age, employed as child workers. Nine southern states had the largest number of child workers, followed by Pennsylvania with 24,000, New York 20,000, Missouri 14,000, Illinois 12,000, New Jersey 11,000, and Massachusetts 10,000.

Limiting the figures to occupations other than agriculture, 1.4 per cent of all the children, 10-15 years of age, in the United States were found in such occupations.—U. S. Children's Bureau, Washington, D. C. (Press release received November 4, 1932.) E. R. H.

**Carbon Monoxide Poisoning in Garage with Doors Open**—One of the members of the staff of the Maryland Department of Health collapsed in his garage while tinkering on his automobile and with the doors of the garage open while he worked. He crawled under the engine and, realizing suddenly that he was getting light-headed, crawled out, and started out to the open door, but fell before he reached it.

A boy of 17 passing saw the figure collapsed over the fender and heard the engine running. The boy pulled the victim out into the open air, instituted artificial respiration until help arrived when the victim, still unconscious, was rushed to a nearby hospital. After the

use of oxygen for 45 minutes, consciousness was regained.

(This case serves to illustrate that carbon monoxide poisoning is a matter of the concentration of the gas wherever it is, enclosure or no enclosure. Numerous other instances are also in the literature where mishaps have occurred out in apparently open spaces, as on cinder dumps, along side of furnace rooms, bustle pipes around blast furnaces, etc.—Abstractor).—Maryland Dept. of Health, *Press Bulletin* 435, Nov. 28, 1932. E. R. H.

**State Requirements for Industrial Lighting**—This handbook designed for the protection of women workers contains basic considerations; the importance of good lighting from the standpoint of eye fatigue (by Janet Howell Clark), the Code of the American Standards Association for Lighting Factories, Mills and Other Working Places; a resumé of state lighting codes; and state lighting requirements other than lighting codes.

The Women's Bureau has investigated about 1,300 establishments in 13 states during the period of more than 10 years. Of these, natural lighting was reported satisfactorily in 762, and artificial lighting in 538. As a rule, simply the judgment of the bureau's investigators was used rather than instruments of precision.

In April, 1931, only 13 states had lighting codes, 19 states had no legal requirements, 8 states and the District of Columbia had some general requirements applying to all parts of manufacturing and mechanical establishments, and 10 only some general requirements applying to certain limited places only. It is to be noted that these 10 states were: Connecticut, Illinois, Indiana, Michigan, Minnesota, Nebraska, Rhode Island, Texas, Virginia, and West Virginia.—U. S. Women's Bureau, *Bulletin No. 94*:65, 1932. E. R. H.



# FOOD AND NUTRITION

**A Comparative Study of Milk in Bottles With Single and Double Caps**—Bottled milk in transit from the filler to the consumer is subjected to temperature changes which lead to expansion and contraction causing appreciable quantities of fluid to be extruded or sucked in around the edge of the cap. The transfer of extraneous organisms from the surface of the cap and lip to the contents of the bottle depends wholly upon the protection afforded by the cap.

The object of this investigation was to determine the extent of contamination that may arise in this way and to measure the nature of this contamination and the possibility of its constituting a definite health hazard. This study was carried out under the conditions of city and rural milk delivery. The bottles of milk used in this study were closed with the ordinary single cap and exposed to the ordinary treatment of transportation and delivery. Bottles of an exactly similar sort and similarly exposed but protected with an additional hooded cap were used as controls. These tests were carried out in the period of April to July, incl. The samples analyzed represented in each case the last deliveries of the day.

Volume changes in bottled milk, which may occur under actual conditions of handling, were also studied. Observations were made under conditions of rising and falling temperatures and recorded time intervals. The bacteriological determinations employed were as follows:

- (a) Total count on the cap
- (b) Test for *B. coli* on the cap
- (c) Test for anaerobes on the cap
- (d) The *Standard Methods* bacterial count of the surface of the cream
- (e) Bacterial count of the whole milk

The tests on the cap were made after removing the outer cap or directly from the top of the single cap bottles. The results of this study are summarized as follows:

1. Significant volume changes in milk may result from differences in temperatures encountered.

2. Bacteria were more numerous on the single caps than on the inner protected caps. Anaerobic sugar fermenting organisms were found on single caps but not on the others. Positive tests for *B. coli* were obtained in 66 (61 per cent) in the single capped series and in 12 (13.6 per cent) of the protected cap series.

3. The bacterial counts of the surface cream averaged from 51 per cent to 121 per cent greater in the single capped bottles than in the double capped bottles.

4. *B. coli* was present with greater frequency in the surface cream of the single capped bottles than in the doubly protected bottles (47.5 per cent as compared to 10 per cent).

5. The bacterial counts of the whole milk averaged between 38 per cent and 64 per cent higher in the single capped samples.

The authors suggest that under certain conditions at least, milk in bottles sealed with the ordinary disc type cap may present a definite hazard to health.

—M. L. Isaacs and I. Zeiber, *J. Hyg.*, 26:806 (Nov.), 1932.

**Numbers and Types of Organisms Found in Certain Products Used in Infant Feeding**—Various samples of powdered milk products were examined bacteriologically to ascertain the numbers of organisms present and to classify the bacteria into groups as cocci, spore-formers, gelatin liquefiers, chromogens, coli-like organisms and hemolyzers. The 20 samples examined consisted of 9 milk modifiers, 2 lactic acid whole milks, 1 synthetic compound, 3 modified milks, 1 protein milk, 1

special milk food and 3 powdered milks.

In 6 of the 9 milk modifiers the predominating organisms were spore-formers; in 1 milk modifier streptococci constituted the greater part of the flora; in 1 similar product short bacilli predominated and in 1 other sample cocci, short bacilli and yeasts were present. In the 9 milk modifiers examined the total counts ranged from 37 to approximately 32,000 per gm. of powder. Spore-formers, as few as 7 per gm. in one sample and as many as about 30,000 per gm. in another sample, were found in the milk modifiers. One of the samples contained no gelatin liquefiers, the others containing liquefiers ranging up to 3,900 per gm. No molds were present in 2 samples but in the other 7 samples molds were found ranging from 2 to 175 per gm. Eight of the 9 samples contained hemolyzing bacteria, the maximum being 9,783 per gm. found in one sample.

The predominating organisms in the 2 lactic acid milks were staphylococci and streptococci. Total counts on these 2 samples were 2,625 and 5,975 per gm. Spore-former determinations showed 80 and 1,342 per gm. One sample contained 20 gelatin liquefiers per gm.; the other contained some 400 such organisms per gm.

Molds were present in both samples, reported as 15 and 37 per gram. Also both samples contained hemolyzers (640 and 722 per gm.). Examination of one sample of synthetic compound showed a total count of approximately 21,600 per gm., spores about 2,800 per gm., gelatin liquefiers 286 per gm. and hemolyzers approximately 11,000 per gm. The organisms were mainly diplococci.

In the 3 samples of modified milks streptococci and spore-formers were found. The total counts on these samples varied from about 5,600 to 12,000 per gm.

Differentiating into groups the following figures are reported for the modified milks examined; spore-formers between 466 and 7,658 per gm., gelatin liquefiers between 210 and 3,800 per gm., molds between 0 and 41 per gm., and hemolyzers between 940 and 4,133 per gm.

Examination of one sample of protein milk showed the following results: total count 350 per gm., spore-formers 43, gelatin liquefiers 19, molds 42, and hemolyzers 24 per gm. The organisms in this product were cocci and short bacilli.

One sample of special milk food was examined showing: total count 6,150 per gm., spore-formers 358, gelatin liquefiers 153, molds 47, and hemolyzers 256 per gm. This sample contained staphylococci, streptococci and yeasts.

The organism found in the 3 samples of powdered milk were spore-formers, staphylococci and streptococci. In this product the total count ranged from 526 to 98,000 per gm. Differentiated into groups the following figures are given: Spore-formers from 65 to 1,000, gelatin liquefiers 47 to 458, molds 0 to 227, and hemolyzers 114 to 19,000 per gm.

No coli-like organisms were found in any of the 20 samples examined. The figures given in the report were obtained by computation, averaging the counts on all sub-samples taken from each can and from all cans of each product studied. Viridans and beta hemolytic streptococci were found in 5 different products and their presence was questionable in 2 others. Cultures of hemolytic streptococci obtained from one sample were not pathogenic for guinea pigs.—Helen A. Mattoon, *Am. J. Dis. Child.*, 44:16 (July), 1932.

Evidence of the Existence of a Dietary Principle Stimulating General Growth and Lactation—This is an extended study of effect of liver on the growth of rats as the result of pre-

vious reports in the literature as to the growth stimulating properties of both liver and lettuce when supplementing a complete synthetic diet.

The authors used a basal synthetic ration containing salt mixture, cod liver oil, wheat germ and dried yeast. Copper, although not added, is present in the mixture. Fresh ox liver was fed to 40 to 50 gm. rats at levels of 0.5 to 1 gm. per rat per day. There was a marked growth response at both levels compared to the controls but practically no difference between the 0.5 gm. and the 1 gm. supplements. The response in growth is rapid.

On autopsy no increase in adipose tissue was found. The increase is deemed much greater than could be charged to a biological variation. To determine transmissibility to offspring, rats were fed both control and liver diets before breeding. The mother received 1 gm. fresh liver daily during growth and gestation and twice this throughout lactation; the male received 0.5 gm. The young were given no liver and only the basal ration.

There was no difference in weight of the litters at birth and no marked difference for 21 days. At this point, however, a marked increase in weight occurred in the litters from liver-fed parents. The final weight of these rats ranged from 70 to 100 gm. heavier than those born of control animals. There was also evidence of a larger number of offspring from the liver-fed parents.

Equally satisfactory growth was evidenced in the young rats of liver-fed parents whether the preliminary liver feeding extended over 16 weeks or only 4 to 5 weeks prior to mating. It was also found that the liver had a stimulating effect on lactation.

Further experiments show this growth-promoting substance to be distinct from other accessory food factors, particularly with respect to vitamin B<sub>1</sub> or B<sub>2</sub> or mineral content (manganese).

The only suggestion advanced by the authors is a stimulation of the anterior pituitary gland and the liver substance has been tentatively termed by them "physin."—Leslie William Mapson, *Biochem. J.*, 26:970, 1932.

**The Transmission of Vitamin A from Parents to Young in Mammals**—Reports on a few autopsies of newborn children indicating a very small store of vitamin A in the liver prompted this investigation to determine the transmissibility of this vitamin from parents to the young in the case of rats. Prior to the main experiment, colorimetric determination of vitamin A was made of the liver from embryo rats. It was found that the store of vitamin A in the fetus is small and is chiefly contained in the liver.

The chief experiment was on female rats with variations in the vitamin A content of the diet from weaning to pregnancy and the vitamin A content of the diet during lactation. Rats were divided into groups receiving separately a very low vitamin A diet, a moderate diet and a diet very high in vitamin A (carotene). Some of the young were killed at birth and the vitamin A determined in the liver oil. More of the young were killed and the livers examined at the end of 21 days.

It was found that vitamin A in the liver at birth is small and subject to little variation. It was not increased with large amount amount of carotene during pregnancy of the mother. The amount is much larger at weaning than at birth and more varied, depending on the carotene fed to the mother during lactation. This increase, however, is limited, apparently due to the amount of vitamin A which can pass into the milk.

In discussing the application of this experimental work to other species, it is concluded that in human beings it is necessary to feed the vitamin A directly

to the infant to build up its reserve of this factor.—William John Dann, *Biochem. J.*, 26:1072, 1932.

**The Action of Copper in Iron Metabolism**—In previous studies on the rôle of copper in hemoglobin formation the test has been made of the increase on pure iron alone against iron with copper supplement. This work was undertaken to determine how copper functions in this connection.

Litters of young rats were kept with their mothers on screens until weaning at 21 days. By determining the iron content of young rats at different periods during weaning it was found that with rats raised in this manner for 21 days the iron content is about one-half that of those raised by the old method on shavings, the actual figures being 0.10 mg. iron on screens against 0.25 mg. iron on shavings. The young rats after weaning were placed on whole cow's milk. When the hemoglobin had decreased to 2 to 3 gm. per 100 c.c. of blood, the iron content of liver and spleen was determined.

The remaining rats were then given 0.5 mg. of iron as pure  $\text{FeCl}_3$  daily. At the end of 2 weeks, 2 of these rats were killed and livers and spleen analyzed. Iron was taken away from the remainder and they were fed 0.05 mg. of copper as  $\text{CuSO}_4$  daily. After 2 weeks these rats were killed and the livers and spleens analyzed. The 2 weeks' feeding of pure iron showed no increase in blood hemoglobin but a decided increase in iron content of the liver and spleen. On the copper substitution the increase in hemoglobin was 2 gm. as compared with 0.1 gm. on iron, and the iron content of the liver returned to about the same level as before iron feeding. The total iron in the spleen increased slightly.

These results indicate that iron is assimilated and stored in the absence of copper but is not available for hemo-

globin formation. Variation in this work was the continuation of feeding milk after 2 weeks on iron. There was a slight loss in iron content but not comparable to that when copper was fed. A comparison was also made between storage ability of the liver when organic iron was fed compared to inorganic. Livers in the animals on  $\text{FeCl}_3$  contained about 5 times as much iron as those on hematin.—C. A. Elvehjem and W. C. Sherman, *J. Biol. Chem.* 98:309 (Oct.), 1932.

**A Biochemical Study of Irradiated Milk**—This work represents a study of the physical, chemical, and biological changes produced in milk—and milk fat—after excessive irradiation. The milk flows through a cylindrical apparatus with a carbon arc inside. The emanations are between 2,800 and 3,100 Angström units and of an intensity 1,260 times that of bright sunlight. Feeding experiments have shown that this irradiated milk has increased 16 times in vitamin D potency while the A factor is diminished only 14 per cent.

Milk is passed through the apparatus 8 times and then analyzed. The chemical composition is changed very little. The pH of the irradiated sample is slightly higher, accounted for by the reductions in bacterial count. Butterfat of the irradiated milk was made into butter and the butter analyzed. The chief difference here is the shorter induction period for oxidation after irradiation—20 hours compared to 17 hours.

The rate of digestion of the proteins of the irradiated milk was also determined both with pepsin and with trypsin. There was no retardation of digestion but in the case of pepsin at the end of 24 hours there was a slight acceleration in activity. In the case of pepsin the irradiated sample digested more readily during the early stages of digestion and at the end of 24 hours

was slightly surpassed by the non-irradiated sample. The rapid digestion is possibly due to a destruction of the anti-enzymes by irradiation.

Since the irradiation was deliberately excessive in these experiments the

authors conclude that in normal irradiation there would be no detectable change in the composition or digestibility of such milk.—Arthur K. Anderson and Howard O. Triebold, *J. Dairy Sci.*, 15:469 (Nov.), 1932.

## CHILD HYGIENE

### UNITED STATES CHILDREN'S BUREAU

THE annual report of the Chief of the U. S. Children's Bureau is always of considerable interest to those concerned with the broader aspects of child welfare. The twentieth annual report recently issued is of special value in clearly pointing out the implications of the industrial depression, as it bears upon the various phases of child health, child labor, recreation, dependency, and delinquency. The report covers the activities of the bureau in relation to the following:

1. Unemployment and child welfare
2. Research and general educational work in maternal and child health
3. Extent of assistance granted under mothers' aid laws
4. Prevention and treatment of delinquency
5. Coöperation with state, county, and insular public-welfare agencies
6. Industrial hazards affecting working minors
7. Employed boys and girls in Rochester and Utica, N. Y.
8. Current statistics in child welfare and related fields
9. Legislation affecting child welfare
10. State child-welfare commissions
11. Publications issued, in press, and in preparation

The Children's Bureau is now the only Federal agency compiling reports relating to unemployment relief. . . . Since January, 1932, monthly bulletins have been issued by the Children's Bureau in planographed form showing trends in relief expenditures and number of families aided, and meals and lodgings for transient and homeless persons, in

136 cities of 50,000 and more. More than a thousand agencies or divisions of agencies have been coöperating in the project. . . .

The report of the study of maternal deaths in 15 states, made in coöperation with the state boards of health and state medical societies, was reviewed in great detail by individual members of the bureau's obstetrical advisory committee, and was considered at a 3-day meeting of the committee held in January, 1932. Because of the great value of the material the committee recommended further statistical analysis of a number of points, and the publication not only of the detailed technical report of interest to obstetricians but also of a condensed report for more general use. Revision of the detailed report is nearing completion.

A survey of the unusually high infant and maternal mortality in New Orleans has been undertaken in collaboration with the New Orleans Parish Medical Society, the departments of pediatrics and obstetrics of Tulane and Dillard Universities, the Child Welfare Association, the city board of health, the Touro Infirmary, and other agencies. Interest has been focused on the relation of the death rates to such factors as age, race, hospitalization, preventive care, attendant at birth, and district of the city in which the deaths occurred. Statistical analysis is being made of the infant mortality rates for children born in New Orleans during 1930 (the most recent year for which complete birth and death data are available) and of maternal mortality rates for 1929, 1930, and 1931. A survey of the facilities available in New Orleans for the care of infants and young children and for maternal care is being made by physicians of the bureau staff, and the report will cover all agencies and institutions which offer facilities for preventive as well as curative care. In addition, the bureau's consultant in obstetrics

has investigated currently the maternal deaths occurring in the city during the calendar year 1932 and reported the findings to a committee of the New Orleans Parish Medical Society. It is the purpose of this committee to study the data presented and to decide as far as possible whether or not the deaths should be considered as preventable. . . .

Short, intensive courses in obstetrics (given on request of state departments of health and county medical societies) for doctors in active practice, carried on for 2 years through the coöperation of the medical school of Emory University in Atlanta, Ga., were extended during the past year to rural communities in Kentucky and Mississippi. Courses are scheduled for New Hampshire, and the work is to be completed in Mississippi and Kentucky during the present fiscal year.

Analysis of material collected in the New Haven study of neonatal morbidity and mortality has continued. Because prematurity is the chief cause of neonatal deaths a special study of the care given premature infants in a number of communities is being made, 91 hospitals in 22 cities have been visited during the past year. The object of this study is to determine: (1) The provision made in hospitals for the care of premature infants and the type of care given; (2) the mortality from prematurity. It is well known that the smaller the premature baby the less the chance of survival, so that total mortality figures (usually the only ones available) are not so valuable as figures compiled by weight groups. Therefore, the coöperation of the hospitals visited has been sought in compiling mortality figures in four groups according to weight at birth. . . .

During the year the bureau undertook a short study, in coöperation with the Social Hygiene Society of the District of Columbia, of the problem of the exclusion of children from schools in the District because of venereal disease in an infectious stage. Reports indicated that such exclusion was often for relatively long periods; for example, it was stated in a recent health and hospital survey made of Washington under the auspices of the Washington Council of Social Agencies that 21 of 43 children under treatment at the social hygiene clinic of the District Department of Health on a given day had been excluded from school for one to four years. The purpose of the bureau's study was to determine, if possible, the actual extent of the problem, so that the results might be used as a basis for constructive planning for these children from the educational and social, as well as medical, point of view. Three hundred and twenty-one children were listed

as excluded from school because of venereal disease by 4 agencies whose records were checked in detail. . . .

The trend of infant mortality in the United States from 1915 to 1930 was definitely downward, the average annual rate of decrease amounting to 3.1 per cent. The expected rate for 1931 on the basis of the 1915-1930 experience would therefore be between 67 and 55. The provisional rate, 62, is within these limits of expectation; the reduction is slight when the decline during 1915-1930 is considered but important in view of prevailing economic conditions. . . .

The latest figures giving infant mortality rates by cause of death are for 1929. In the 1921 registration area referred to, during the period 1921-1929, there is a statistically significant downward trend in infant mortality amounting on the average to 2 per cent annually. In the rates from natal and prenatal causes the decrease was about 1 per cent each year, in epidemic and communicable diseases about 4 per cent, and in gastrointestinal conditions 8 per cent. The mortality from natal and prenatal causes reflects the prenatal care the mother receives and the care for both mother and baby at the time of childbirth as well as the neonatal care of the baby. Popular education as to the importance of breast feeding, the proper care of milk, the preparation of simple formulas, the introduction into the infant's dietary of the right foods at the right time, as well as the value of sunshine, fresh air, and good routine in the care of baby, explain the large reduction in deaths due to gastrointestinal causes. Unquestionably this popular education has proved its value and should be continued. . . .

The only cause of maternal death in the United States for which 1930 figures are available is puerperal septicemia. In the 1921 area referred to, the rates from this cause decreased from 1921 to 1930 on the average 1 per cent per annum. The lowest rate for puerperal septicemia (22.6 per 10,000 live births) was recorded in 1930. Although more than 36 per cent of the deaths of mothers, even with this new low rate, were due to puerperal septicemia, a cause recognized as largely preventable by asepsis, it is encouraging to find that the trend is now downward.

The development of widespread medical interest in attacking the problems of maternal mortality and maternal care is undoubtedly a factor in the improvement which has been noted. State medical societies coöperated in the detailed study of maternal deaths made in 15 states during the last 2 years of operation of the maternity and infancy act, and sub-

"The Town and County Nursing Service" was established with a well-chosen committee to sponsor it.

The efforts of this service were directed along three lines—spreading the idea of public health nursing throughout the country, seeking qualified nurses as the demand grew, and giving the nurses guidance and encouragement to insure their professional growth and success.

One by one, to the southern mountains, to mining camps, to farming counties, to small towns, to an industrial village, went Red Cross nurses, often the first to undertake rural work in a given state, and with them went a constant stream of wise advice and encouragement.

From the very first the Red Cross realized that nurses needed special training to do this rural work and against great odds clung to high standards. The first nurse in charge of this service worked closely with the few postgraduate courses for public health nurses then in the country, and with leading visiting nurse associations, and was aided by Mrs. Reid's scholarship loan fund.

The World War had a crippling influence on the growth of the Red Cross nursing service, but at its close it received a tremendous impetus as many of the chapters which had been working at high pitch now turned their attention to community welfare needs. Red Cross nurses returning from military service were available for rural positions, and many hundreds were rushed to postgraduate courses on scholarships. National Headquarters increased its supervisory staff both in the office and in the field to keep up with the enormous demand for nurses in the rural communities and to direct the work into safe channels. At the height of the boom period the Red Cross had 2,100 public health nursing services which it had launched.

As war surpluses dwindled chapters

began to think of getting tax support for their public health nursing services. Many transferred them to school boards and county health departments for financing after the demonstration had been made. Other chapters entered into partnership with public agencies in financing nursing services, and this proved a sound principle.

In the last few years the Red Cross has turned its activities to providing more nurses to meet the needs more adequately in a given community, and to refining its nursing procedures. Its thrice revised manual on rural school nursing is the leading textbook in this field.—Elizabeth A. Fox, *Twenty Years of Red Cross Public Health Nursing*, *Red Cross Courier*, XII, 6:173-174 (Dec.), 1932.

It would be interesting to know the number of states in which the American Red Cross was responsible for the establishment of a department of public health nursing in the state board of health. In 1920 the Red Cross nursing field representative for Indiana became also the director of the Department of Public Health Nursing for the State Board of Health. The state furnished her office but the American Red Cross continued to pay her salary and expenses until a few months later when the State Tuberculosis Association began to share equally in financing her. Later the State Board of Health took over all the financial responsibility for the department.

It would be difficult to overestimate the influence the American Red Cross had in establishing both city and rural public health nursing services in Indiana. Official funds are usually not forthcoming to finance a nursing service unless a demonstration has been made for from 1 to 4 years. The Red Cross chapters and county Tuberculosis Associations furnished funds and supervision for the demonstration here.

Now when official funds are again

health matters she may forget that the family physician must assume the responsibility; potentially he is the most important cog in the working out of preventive medicine.

There are many fair minded physicians who are more content and easier in their minds when the public health nurse does not visit their patients. The nurse who criticises the physician would soon cease if she had to assume his responsibilities for only a short time.

Those interested in furthering the welfare of preventive medicine could not do better than in interesting the private physician in this work. It is infinitely more important to make sure of his coöperation than to attempt the training of the whole public. By the very nature of his education and work he will be the most easily interested. When the time has come that his importance is realized and full use is being made of him and when his confidence is sought and won, then will he seek out the public health nurse in his work. Then and only then will he think well of public health nursing.—

A. M. Jeffrey, M.D. *The Private Physician Looks at Public Health Nursing, Canad. Pub. Health J.*, XXIII, 10: 459-463 (Oct.), 1932.

**As the Public Sees Us**—It would be a great deal easier for the public to understand what public health is if the public health workers could only agree on a definition themselves. In the *Survey of Nursing Education in Canada* nurses were even asking themselves if nursing was a profession.

One lay person gave this definition of public health nursing, "It is not really nursing at all; it is a camouflage to call it nursing it is really the teaching of hygiene, and it is called nursing because people are more in favor of nursing than teaching; and so it is easier to get it paid for out of taxes."

The public is a composite of groups in the community, all of which have different ideas of public health nursing.

The tax payer comprises one group. He sees public health nursing as "the

latest fad to deplete his 'wad' or the last frill to empty the tradesman's till." The best way to meet this gentleman is to subject him to a steady drip of information as to the cost of public ill-health.

The individualist is in another group. He likes independence of mind and body and dislikes "molly-coddling." In self defense we need regulation of public health in our modern communities; public health is not an individualistic matter.

There is the conscientious objector whose religious faith or social prejudices make him look askance at any attempt to coerce him in health matters. Simple statements as to the achievements of public health in saving child life, and in reducing infant and maternal mortality are probably most effective in convincing him of its value.

Then there is the conscientious critic who has known a case where a public health nurse diagnosed a case or tried to treat a patient. He thinks public health nursing is an unauthorized invasion of the physicians' territory. The public health and nursing profession are with this critic in his views, but "he should not judge a stocking by its holes."

The public is a little suspicious of a nurse who lectures instead of poulticing; that is why the work of the visiting nurse has such strong appeal; it appeals to the emotion and instincts, and "the public loves to feel and hates to think."

Despite all these apparent criticisms of public health nursing the *Canadian Survey* states that the attitude of the public is 59 per cent ideal toward public health nursing. "There is a growing volume of instructed opinion behind this work despite the fact that, in this time of financial distress, economies are apt to take strange directions."—Adelaide M. Plumptre, *The Public Looks at Public Health Nursing, Canad. Pub. Health J.*, XXIII, 10:463 (Oct.), 1932.



office. Stanley H. Osborn, M.D. (as Dr. Brown, Health Officer).

Father receives first-aid. Sarah R. Addison, R.N. (as the public health nurse).

Joe discusses his future with Uncle Bert. Albert S. Gray, M.D. (as Uncle Bert).

They look for a good place to eat—Uncle Warren along. Warren J. Scott (as Uncle Warren).

They are disappointed that Cousin Stan fails to bring his little girl along. S. Harcourt Peppard, M.D. (as Cousin Stan).

Joe cuts his foot—They visit the doctor's office. Millard Knowlton, M.D. (as Doctor Millard).

Betty has a good time at an amusement park, Cousin Henry along. Henry P. Talbot, M.D. (as Cousin Henry).

They stop at the Lee Dairy for milk—Friend Lee Mickle (as an old friend, Mr. Lee).

Joe and Cousin Larry make a rush trip to a school. Lawrence A. Fagan (as Cousin Larry).

They are curious about a drive for funds for a dental clinic—Uncle Clyde along.

The family included: father, William C. Welling; mother, Elizabeth C. Nickerson and Ruth A. Kearns; Joe, aged 17, J. Henry Giles of the Bureau of Sanitary Engineering; Betty, aged 14, Jean Evans of the Bureau of Administration.

For mimeographed copies of the series send *10 cents* to Elizabeth C. Nickerson, State Dept. of Health, Hartford, Conn.

#### LOW COST DIET

"Publications On Low Cost Diet," issued by Social Work Publicity Council, 130 East 22d St., New York, in a much revised and amplified edition is divided into two parts. One part lists leaflets, folders and booklets for health and social workers, and *administrators* of food budgets. Another part lists material suitable for distribution, or for reproduction for distribution. 5 mimeographed pages. *6 cents*.

"Thrift in Food For Health Protection," by Lucy H. Gillett. 4 pp. Secure from a state or local tuberculosis association. "Health During the

Growing Period," "The Health Account of the Adult," "The Best Food Values at Minimum Cost." Not for lowest income groups. *Samples free* from National Tuberculosis Association, 450 7th Ave., New York.

"Good Food for Little Money" to protect the health of Children, by Lucy H. Gillett. American Child Health Assn., 450 7th Ave., New York. 2 pp. A very condensed "guide to the wise and economical selection of foods for the family." 1 to 3 copies, *3 cents* each; 4 to 9 copies, *1 cent* each. Lower rates for quantities.

"Good Food For Little Money," by Helen MacMurchy, M.D., Dept. of Pensions and National Health, Ottawa, Canada. 14 pages; 3 x 6 inches; in English or French. "The trouble in Canada at present is not so much that we cannot get food. We can generally get food. But we need to choose our food better, to cook it better, and to use it to the best advantage."

"Food Helps For 1932-1933," a 4-page folder, New York Tuberculosis and Health Assn., 386 4th Ave., New York. Lists publications for the worker and for distribution, and motion pictures and posters offered for use in New York City. No copies of the folder are available.

A course in emergency nutrition problems was offered in December by the Boston Health League and the Boston Council of Social Agencies. Limited to 100. Topics: "Nutrition and Social Welfare"; "Low Cost Budgets—How Essential Are They and How Practical Can They Be?"; "Low Cost Budgets—How Can We Teach Families to Follow Them?" "Tulsa Plans and Other Makeshifts in Food Budgets."

A series of large-page folders and leaflets has been prepared by a group of Boston nutrition services, and is distributed by the Boston Health League. They are well printed, with good, read-

able type. They are notable for the effort to teach simple nutrition facts. Several interesting devices will help the better educated readers. One device is a series of illustrated paragraphs, such as:

(Picture of milk bottle)

1 quart daily for each child

1 pint daily for each adult

gives

*calcium* for bones and teeth

*protein* for growth, muscle and repair of the body

*sugar* for energy to work and play

*vitamins* for health and vigor

One wonders how far we can go in teaching even elementary dietetic science when people are harassed with fear of having a mere sufficiency of food.

#### HONORABLE MENTION

To *Welfare Advocate*, Public Welfare Commissioner, Manila: for improvement in paper and printing, and for improved folding for the mails. (Much space is given to public health topics.)

To Milbank Memorial Fund, New York City: for the chapter on "Health Education" in its report for 1931. a record of varied and valuable service in diverse coöperative efforts.

To United Hospital Fund of New York City: for annual report with a table of contents.

To New York State Department of Health: for annual report with table of contents and index (although not complete).

#### REPORTING

The House of Open Doors is a report, but not an "annual report," of the Wisconsin Anti-Tuberculosis Assn., Milwaukee. It is a chatty, readable tour of "the old gray building on Jefferson Street" where so much is done that concerns so many people in Wisconsin. It is mimeographed, with at least one informal sketch on each of the 9 pages. Copy for 10 cents.

January 1, 1933, Commissioner of Health Shirley W. Wynne submitted to the Mayor of New York City a 9-page review of the work of the department *with statistics for 1932*. Of the per capita expenditure of 68 cents it was reported that "less than 1 cent is spent for the work of health education including the publication of pamphlets, the preparation of radio talks, the organization of lecture meetings, and exhibits, and the issuance of bulletins of information to newspapers, magazines, etc."

#### CHILD HEALTH EDUCATION

"Some Recent Contributions to Health Education": A list compiled as a service to instructors giving courses in health education. American Child Health Assn., 450 7th Ave., New York. 4 mimeographed pages. Single copy *free*.

"Some References on Child Care and Training" for those conducting child care classes in secondary schools or parent-teacher groups. American Child Health Assn., 450 7th Ave., New York. 5 mimeographed pages. Single copy *free*.

"Safety and Health of the School Child," by J. F. Rogers, M.D., of U. S. Office of Education. 29 mimeographed pages. 1932. "A self-survey of school conditions" covering "Physical conditions of the school plant affecting the life and health of the child," "Mental conditions of the school influencing health," "Bodily conditions of the child affecting his life and health and that of others," and "Teaching staff," with "reading references." 10 cents. Superintendent of Documents, Washington, D. C.

*Journal of Home Economics*, Baltimore, carries considerable material on nutrition and its place in health education in the schools. *Sample free*. In Nov., 1932, issue: "Nutrition Needs of the School Child and the Responsi-

bility of the Home Economics Teacher," by Lydia J. Roberts; "Health Education in the Public Schools of Akron, Ohio," by Martin and Davison. (The last is a National Dairy Council project.) 30 cents.

Again the Child Health Education Service of the National Tuberculosis Assn., 450 7th Ave., New York, invites women candidates for a full tuition scholarship of \$500 at the Massachusetts Institute of Technology.

From the University of Texas, Bureau of Nutrition and Health Education, Austin, come three publications of a series: "Activities of Frogs and Toads" (4th grade; 20 cents); "Activities of Birds" (5th grade; 20 cents); "Activities of Honey-bees" (6th grade; 25 cents)—all by Jeanie M. Pinckney and Alice H. Miller. Each "is one of a series of units of health instruction published in workbook form. The purpose of these work books is to teach growth, development and social hygiene. . . . The pupil is presented with a series of problems which he solves himself."

#### ADVERTISING

"The Urge to Excess" discredits claims made in certain coffee and laxative advertisements. *Journal of A.M.A.*, Chicago. Nov. 19, 1932. Good to add to your portfolio or scrapbook of debunking food and drug material offered to the public for reference.

Good for similar use is a series entitled "Know-your-drugs," issued by U. S. Department of Agriculture, Washington. Ask for *Clip Sheet* issues containing the above series.

#### MOTION PICTURES

"There is an urgent demand for new and up-to-date films if this form of service is to be continued. The use of 16 mm. films as recommended by the Film Committee would materially cut down the cost of this service."—Ernest

D. Easton, New Jersey Tuberculosis League.

"Motion Pictures as an Aid in the Teaching of Nursing Procedures," by Anne M. Goodrich. *Trained Nurse*, New York. Nov., 1932. The value of pictures; problems in taking and using pictures. Illustrated by selections from pictures already available through Anne M. Goodrich, 108 East 38th St., New York. In 35 mm. and 16 mm., for rental or sale.

"1000 and One—the Blue Book of Non-Theatrical Films." *Educational Screen*, 64 East Lake St., Chicago. 1932–1933 edition. 128 pp. 75 cents; 25 cents to subscribers to the magazine. Classified lists of silent and talking pictures, both 16 mm. and 35 mm., free and otherwise. Includes physiology, health and hygiene.

#### DISCONTINUED

"Tidings," Child Hygiene Division, Massachusetts Dept. of Health, has ceased publication "for a while."

The weekly health and communicable disease bulletin of Oregon State Board of Health has lost the franking privilege. The mailing list will be limited to health officers and newspapers, and to those who will pay postage at one cent a copy.

#### RADIO

"Writing the Home Economics Radio Program," by Morse Salisbury. *Journal of Home Economics*, Baltimore. Nov., 1932. Reprint, 10 cents. Get a copy, change "home economics" to "health education," and you have a most stimulating and practical guide to effective radio presentation.

In same issue of the *Journal* are several editorial notes on broadcasting. 30 cents.

Radio talks during the Christmas seal sale in Ohio: "Robbing Tomorrow to Pay for Today," "Health and the Depression," "Short Cuts,"

"Dollars and Sense," "Health Consciousness," "Tuberculosis and the Press," "What Are They Singing?"

Radio talks in New York City's Christmas seal sale: "Something to Be Thankful For," "A Tiny Friend of All Children," "Youth's Greatest Asset," "Public Health in the Red," "Hidden Children," "Have You a Health Problem?" Three of the series were given over N.B.C. or Columbia chains.

#### EDUCATIONAL MATERIAL

"Illumination and Eyesight in Industry," by LeGrand H. Hardy, M.D. National Society for the Prevention of Blindness, 450 7th Ave., New York. 12 pp. 10 cents. For the employer, safety director, industrial physician or nurse, labor leader.

The 1932-1933 catalogue of publications, Commonwealth Fund, 41 East 57th St., New York, has sections on "Health," "Mental Hygiene," and "Mental Hygiene Pamphlets."

The Educational Department, California Fruit Growers Exchange, Los Angeles, Calif., offers a 1933 series of bulletins for food teachers and nutrition workers.

**The Full Endorsement of the Advisory Council**—A distinguished group of men have promised again what has been promised before but probably never realized as yet. "*Only those manufactured products which have the full endorsement of the advisory council*" "will be given a place" in the first annual New York Food and Health Exposition, Grand Central Palace, New York City, April 3-8, 1933. The "full endorsement" is promised by Dr. Wynne of New York City, Dr. Parran of New York State Department of Health, Dr. Mendel of Yale, Dr.

Rosenau of Harvard, and Dr. McCollum of Johns Hopkins.

It would be interesting to learn the procedure by which this competent group bestows or withholds its "endorsement," and how it will function when desperate space salesmen sell space to a product which is not 100 per cent endorsable. And will the endorsement cover the advertising claims made for the product, as well as for the merits of the product?

**In Your State**—Due to the curtailment of the activities of Cleanliness Institute, the National Tuberculosis Association has been designated by that organization as the repository and distributor of all their printed matter dealing with public health. The National Tuberculosis Association has made arrangements through its state and local associations to distribute this material to schools, industries and the general public in accordance with the general plans that have been established by the Cleanliness Institute. Any persons desiring publications of the Cleanliness Institute should make application to their state or local tuberculosis associations.

#### MAGAZINE ARTICLES

"Where the Normal Diet Fails," by E. V. McCollum. *McCall's*. June, 1932.

"Medicine Marches Forward," by Alva Johnson. *McCall's*. June, 1932.

"Progress will always seem slow enough. The age of miracles is past, and human ailments are too numerous and elusive to be conquered in one swift campaign."

"Birth Control: A Balance Sheet," by R. E. Baber. *Forum*. Nov., 1932. Health aspects: social and economic factors: moral and religious factors: the balance sheet.

## BOOKS AND REPORTS

**A Century of Public Health in Britain, 1832-1929** — By *J. H. Harley Williams, M.D., with a foreword by W. W. Jameson, M.D.* London and New York: Macmillan, 1932. 314 pp. Price, \$2.50.

This is a book that adds sunshine to the work of a reviewer. As a believer in the historical foundation of teaching and progress, the writer welcomes it with more than usual pleasure. In America we recognize that we owe to England the foundation of our enthusiasm for public health, or what has been called the "sanitary idea." The author says that the title of his work might well have been "The History of Public Health Prejudices."

The history covers the period 1832-1929 inclusive. All facts are easily available, since what we call modern public health is almost entirely a product of the last 100 years, though it would be ungracious to forget, for example, the Jewish sanitary laws as given in the Pentateuch, the water works system of ancient Rome, and the high degree of sanitary practice which existed in the Isle of Crete. However, most of these things had been practically forgotten, and we woke up only after Chadwick's inquiry of 1842, "the earliest example of the way in which scientific examination of the technical data of ill-health becomes the basis of legislation."

The author begins with the Poor Law Act of 1834, carries us through the Public Health Act of 1875, the attack on the Poor Law, and the Local Government Act of 1929. He considers the National Health Insurance Act (in force July 1, 1912) as perhaps the greatest social measure of this generation, and the most important influence

in medicine since the Public Health Act of 1875.

A section, 71 pages, is given to tuberculosis, in which the author traces the development of anti-tuberculosis measures, stressing the founding of dispensaries by Sir R. W. Philip, who was knighted in 1913 for his achievements; the Act of 1911, in which funds were made available for sanitariums, and the founding of such institutions as Papworth Village and Preston Hall Village. One would think from reading this section that the demonstration of the danger of bovine tuberculosis to human beings was the work of the English Commission appointed after Koch's memorable blunder in 1901. The author has apparently never heard of the work done in America at the Laboratory of the State Live Stock Sanitary Board of Pennsylvania, which published its demonstration of Koch's fallacies in April, 1902, nor of the German Commission which reported about the same time that the First Interim Report of the British Commission appeared, in 1904. Since the author is connected with the National Association for the Prevention of Tuberculosis, he should know and give history somewhat more correctly.

We must also differ with the author in the three lines he gives to Oliver Wendell Holmes concerning puerperal fever. He speaks of Holmes's work as a suggestion, and states that he did not follow up his idea. Holmes's paper was printed in 1843, and reprinted 6 times between that date and 1891. Holmes said distinctly "Puerperal fever is so far contagious as to be frequently carried from patient to patient by physicians and nurses," and also that he had abundant evidence that many

practitioners had been more careful in handling puerperal cases as a result of his warnings.

Vaccination against smallpox is treated of in Part VI, and the demonstration of its value is so clear that one finds it hard to understand the objections raised to it. Conscientious objection has hit England hard. Coercion is repugnant, but education and continuous propaganda must be pushed. The psychological side was given by the *Times* in 1858: "The English people decline to be bullied into health."

The volume closes with sketches of Chadwick, Simon, Florence Nightingale, Francis Galton, and Lord Shaftesbury, all of which are interesting. The index could be improved. The printing and make-up of the book are excellent, and in spite of some faults, we consider it one of the most interesting as well as useful books which have come to us for a long time. MAZÛCK P. RAVENEL

**Medicolegal Cases. Abstracts of Court Decisions of Medicolegal Interest.** Edited by William C. Woodward, M.D., LL.M. Chicago. American Medical Association, 1932. 1336 pp. Price, \$7.00.

One of the valuable features of the *Journal of the American Medical Association* is its Medicolegal Section, in which current court decisions on various aspects of medical jurisprudence and legal medicine are abstracted each week. During the calendar years 1926 to 1930, there were included in this section approximately 1,300 cases, a figure which affords an interesting commentary on the vast amount of litigation involving the medical profession, especially since a large number of these decisions were concerned with malpractice or alleged malpractice.

All of these excellent abstracts have been collected in this impressive volume, preceded by a table of cases, and followed by a comprehensive index. Each

case has an appropriate heading, indicating its salient points, and a citation is given to the volume and page in the national reporter system where the complete law report may be found. The value of these references would have been enhanced if citations to state reports had likewise been presented.

Although much more work would have been necessary if these abstracts had been arranged more closely by subjects, consultation of pertinent cases would have been facilitated by such an arrangement. It would, of course, have been impossible to do this completely, as one decision may include several important points of law. The index, which is a noteworthy feature of the book, permits of ready location of cases on topics with which the reader may be concerned.

A number of decisions on public health are included. Not all of these are indexed under "Health" or "Health Departments," however, but some will be found listed under "Food," "Vaccination," the names of specific diseases, and under other appropriate titles.

The Bureau of Legal Medicine of the American Medical Association, directed by Dr. Woodward and manned by a staff of competent lawyers, is to be congratulated on the publication of this volume, which will prove of inestimable value to physicians involved in legal matters requiring adjudication by the courts. JAMES A. TOBEY

**A Guide to Human Parasitology—**By D. B. Blacklock and T. Southwell. Baltimore: Williams & Wilkins, 1932. 271 pp. Price, \$4.00.

The text is intended especially for the practitioner who does not have access to a laboratory where parasitological diagnoses are undertaken and who may be required to diagnose diseases caused by animal parasites.

It will also prove valuable for medical students taking special courses in human parasitology. The discussions and definitions are intended to apply to those species or groups of parasites found in man, and not to animal parasites in general.

The text opens with a brief discussion on the importance of a knowledge of human parasites and how any practitioner can readily gain this knowledge. One chapter is devoted to the microscope, and one to the preparation of films or smears and their examination for parasites. Chapters IV and XXII inclusive deal with the various parasites affecting man. One chapter is devoted to the Spirochetacea, 6 chapters are given to the Phylum Protozoa, 7 to the Phylum Platyhelminthes, 3 to the Phylum Nemathelminthes, and 1 to a discussion of Myiasis.

Chapter XXIII consists of 11 concise tables showing geographical distribution of worms found in man, the various vehicles in the spread of human parasites, stages of parasites infective for man, parasites and tissues or organs in which they are found and the diagnostic features of parasites. Drugs used in treating the diseases considered with dosages are briefly discussed.

The text is very well illustrated, including 16 full page diagrams showing life histories of human parasites. The brevity, simplicity and clear-cut descriptions of those characters in the various parasites which have immediate diagnostic value are especially commendable features of the text.

L. HASEMAN

*The Canadian Mother's Book—By Helen Macmurchy, M.D. National Health Publication No. 2, Dept. of Pensions and National Health, Canada, 1932. 228 pp.*

Full of flavor and of a style all its own is this little manual for the

Canadian mother; popular, too, judging by the inscription "Eighth Hundred Thousand" on the title page. It is written in simple, colloquial language and one might well imagine that it might prove very comforting to many mothers—especially those of the less sophisticated type. Throughout the book national pride is appealed to by way of reinforcing the precepts laid down. In print and spacing, this book is in agreeable contrast to most governmental publications issued on this side of the international border.

One criticism might be made of nearly all "books for mothers," including this one. If the prospective mother is urged and expected to go to the family physician, it seems inadvisable to go into too great detail as to what the physician will do and tell her to do: there may be differences of opinion between the writer of the book and the physician, to the bewilderment of the patient.

MERRILL E. CHAMPION

*Behind the Door of Delusion—By "Inmate—Ward 8." New York: Macmillan, 1932. 325 pp. Price, \$2.00.*

This book was written by a brilliant newspaper man, a finished speaker, and an active figure in civic affairs, but unfortunately, according to his own confession, he was addicted to the excessive use of alcohol, so much so that after one debauch which pretty nearly ended his earthly career, he was put in an insane asylum of his own volition, where, at the time the book was written, he was still staying until he got rid of an insatiable craving for liquor. It is dedicated "To a better understanding of those on the inside by those who are not yet locked in."

All through the text there is evidence of an acute mind, a keen observer, and an analytic power. The stamp of sincerity and honesty is there, and the book will be a revelation to all who do

not know the inside workings of the ordinary mental hospital, or as they have in the past been called, insane asylums. From cover to cover, it is full of interest to any thinking reader, but especially to physicians and social workers who come up against the problem of drink. His observations of the insane accord in some respects with those of Clifford Beers in *The Mind That Found Itself*. The diagnoses of new cases by old inmates are generally correct and promptly made. Their mode of expressing this diagnosis is usually amusing. Many keep happy, but the pathos of the situation lies in the universal desire to go home. The most striking indictment in the book is of the asylum attendants, most of whom lack conscientiousness, patience, and the mental ability for the thorough study and understanding of each patient which is essential. Many are drifters, going from one asylum to another and obtaining jobs which they hold only until they are found out.

We commend the book to all who are interested in this tremendous problem of modern life. MAZŮCK P. RAVENEL

**The Sputum—Its Examination and Clinical Significance—By Randall Clifford, M.D.** *New York: Macmillan, 1932. 167 pp. Price, \$4.00.*

This book will serve as a valuable reference and text for physicians, laboratory workers and students. It is concise, simply written and well indexed.

Directions are given for collection of sputum specimens for examination, and the author emphasizes the importance of postural drainage as an aid to the patient in raising sputum. Methods and materials for sterilization of the sputum are discussed.

Macroscopic and microscopic examinations are dealt with separately, with descriptions given of the common findings. There are many colored plates and photographs to supplement the text.

The last part of the book is concerned with the character and clinical significance of the sputum in relation to some of the more common diseases of the respiratory tract. The author attempts to aid the clinician and laboratory worker in the diagnosis of lung and bronchial diseases by descriptions of the various types of sputum raised in each case.

He points out the outstanding physical characteristics of the sputum in lobar pneumonia, lung abscess, tuberculosis, and other diseases, together with their significance. Microscopic findings in each disease are added. Several pages are devoted to "Pneumoconiosis" or the different forms of pulmonary fibrosis due to dust inhalation. He stresses the importance of sputum examinations in such cases due to the frequency with which they are confused with pulmonary tuberculosis. Laboratory tests and technique are given to aid in correct diagnosis.

The book contains 167 pages with excellent bibliographies at the end of each chapter. C. C. YOUNG

**The Purchase of Medical Care Through Fixed Periodic Payment—By Pierce Williams, National Bureau of Economic Research, Inc., New York, 1932. 308 pp. Price, \$3.00.**

This report is based on the results of a survey aimed to throw light on the extent to which the people of the United States make use of the principle of insurance in order to secure medical and hospital care. The study was conducted largely by correspondence by the writer, who is a member of the research staff of the National Bureau of Economic Research, upon the invitation of the Committee on the Costs of Medical Care. Emphasis was placed on medical and hospital care "in kind," only minor discussion being given to accident and health insurance.

Consideration is given to fixed pay-



ment medical service in the lumber and mining industries of various states, to a hospital contact system, to service for railroad employees, to group clinics, community health associations, and to certain benefit funds. This will be a useful reference book for several types of students, but is hardly essential, certainly at the price, for health workers.

IRA V. HISCOCK

**Normal Youth—And Its Everyday Problems—***By Douglas A. Thom, M.D. New York: Appleton, 1932. 368 pp. Price, \$2.50.*

This latest book of Dr. Thom is on adolescence. It is a very clear presentation of many of the internal experiences of the adolescent child and influences in his environment which affect his development during this period. For this reason, there is a great deal of emphasis placed upon home and school influences and their effects. Case histories are given in abundance, each one emphasizing the particular point or points that have been discussed. In this manner, Dr. Thom clarifies and illustrates the practical application of his theoretical discussions.

His presentations of sex problems and their nature are set forth with great frankness. Some may question the wisdom of this in a book that will be read so widely and, therefore, by a number of people who, for any of a number of reasons, will not be able to accept this boldness.

This very objective presentation of sex materials is certainly desirable in books whose circulation is limited to certain professional groups. However, anyone who has had any clinical experience with these problems realizes how skillfully this subject must be presented to most lay and some professional individuals in order not to produce resentment. This frankness may serve, therefore, to increase, in

the minds of many readers, their resistance to the understanding and acceptance of the viewpoints presented rather than to diminish them.

There is no discussion of the value or rôle played by religion or objective morality. As there are many people of different religious faiths to whom religion and moral values are of utmost importance in influencing their mental health, it seems that a book of this nature, concerned with the "whole" child, should have given more than passive reference to this group of influences. Moral and religious values are dominant characteristics of the healthy and well integrated individual. These values cannot be ignored in any type of constructive therapy that aims to build up the total personality of the individual.

His approach to the problems of adolescence is essentially dynamic and analytic. The influences of Freud on the author's interpretation of these problems is evidenced throughout.

The author has a very clear style with the result that this book is by no means difficult to read. It consists of eleven chapters and an index. It has much value to the person who is interested in obtaining a knowledge and insight into many of the problems that are characteristic of adolescence and especially those conditions which impede or aid the child's attempt at adjustment and development during this period.

FRANK J. O'BRIEN

**Die Arbeitsbehandlung zur Reform der Lungenheilstätten—***By Prof. Dr. Hanns Alexander and Kurt Alexander, Volkswirt. Leipzig: Georg Thieme, 1932. 100 pp., 44 figs. Price, M. 5.*

This is a very fully illustrated account of recent developments in Europe, especially in Switzerland, Holland, and Germany, of the problems of employment in sanatoriums for tuberculous

patients. Employments available or in use in the institutions are treated from the standpoints of purpose, choice, adaptability, direction and control, costs with financial support and returns, selection of articles to be made, incentive, and compensation. The therapeutic values are considered, and types of intellectual occupations for middle-class patients are discussed with reference to their social and public relations.

A full account is given of the organization, administration, and details of such a sanatorium at Agra near Lugano, in which intellectual and professional work is fostered instead of handicrafts. Labor in trades and handicrafts is described in considerable detail from twelve other prominent European institutions. C. A. KOFOID

**The International Medical Annual—**  
*By Carey F. Coombs and A. Rendle Short, editors, and twenty-nine contributors. New York: Wood, 1931. 551 pp. (illus.). Price, \$6.00.*

A useful volume rather difficult of adequate description in limited space. It is a kind of dictionary of "practical medicine," written by 31 men from the British Empire, mostly from England. In the language of the fly-leaf, it is "A Review of the Year's Work in the Treatment of Disease," in which they include everything from chemical therapeutics to vaccination and surgery. However, the editors inform us that they studiously omit pathology, animal experimentation and mere theories. All items are arranged alphabetically.

Typical of the treatment given the various subjects, scarlet fever might be mentioned. Following brief cross references, such phases of the disease as epidemiology, etiology, symptoms and complications, Dick test, prophylaxis and treatment are reviewed by Dr. J. D. Rolleston, while Dr. G. E. Oates handles the subject of management. Nineteen

references to recent literature are used—the reviewer often agreeing with the papers before him. It is interesting to note that the opinion is concurred in "that until a technic is available that is sufficiently precise to identify the scarlet fever organism as well as sufficiently simple for general application, the control of scarlet fever must continue without the aid of throat cultures." On the whole, the book should find a hearty welcome on every practitioner's shelf.

C. F. ADAMS

**Epidemiology. Historical and Experimental—***By Major Greenwood, F.R.S. Baltimore: Johns Hopkins Press, 1932. 88 pp. Price, \$1.50.*

A generous modesty gracing fundamental scholarship characterizes this tiny volume, which contains much wisdom on one of the broadest fields within the disciplines of medicine.

Dr. Greenwood, himself a distinguished successor to the epidemiologists of history, most sympathetically appreciates and relates the merits of ancient contributions to our understanding of disease as a herd or mass or group phenomenon. We are carried in the first chapter from the book of Epidemics of Hippocrates past the foggy theories of Galen into the threshold of modern epidemiology opened to us by Fracastoro. From Sydenham, the clinical colossus, there came but little of great value to epidemiology except a conception of epidemic succession. Then follow Graunt, Henle, Farr, Simon, Ross, and Brownlee, masters and teachers, all leading directly to their peer of today, the present author.

In the second and third chapters we meet the rigorous discipline of the experimentalist, a pioneer in the new epoch wherein bacteriologist and statistician join forces to pose questions and prove answers.

Nowhere else can so concentrated a statement of the philosophy, the argu-

ment, and planned and controlled experience to elucidate human and animal herd experience with disease be found.

While the experimental experience is with communicable disease, the principles of inquiry and the reasoning involved are of no different order from those required in epidemiological study of occupational diseases of mass significance.

The *Pasteurella* and the multitude of mice as studied by Greenwood and Topley have illuminated some dark places, and created shadows where false light shone before. The laboring epidemiologist, the statistician, laboratory director, and teacher of public health will find this charming volume a precious companion of their thoughts.

Paper, print, tables, graphs and references are worthy of the text.

HAVEN EMERSON

**Medical Entomology**—By *Robert Matheson, Ph.D. Springfield, Ill.: Charles C. Thomas, 1932. 502 pp. Price, \$5.00.*

This volume is a scholarly presentation of the present known facts concerning the spread of disease by insects and their allies. It deals with the subject primarily from the entomologist's angle. The medical diagnosis and treatment are only touched on briefly, these being properly left to medical publications.

The text opens with a brief historical discussion on the Arthropods and human disease, followed by discussions on insects and their allies, the rôle of ticks and mites, the Hemiptera or true bugs, and the lice. The Diptera or flies and their allies are by far the most important carriers of disease, and 10 of the 20 chapters are devoted to them. Of the Diptera, the mosquitoes are the most important disease carriers and special consideration is given to them, their identification, and means used to keep them under control. Besides the

mosquitoes, the Psychodidae, the Tabanidae, the blood-sucking nemoceros and muscoidean flies, and the house fly are considered as carriers of human diseases. A chapter is devoted to Myiasis, one to the rôle of fleas in the spread of disease, and one chapter to poisonous biting, stinging, nettling, and blistering insects and allied Arthropods. The final chapter is devoted to the collecting, rearing and mounting of insects for study.

A feature of the text is the tables and keys for identifying the various species of Arthropods considered. The illustrations are good, and while not numerous, are well selected. It was written as a textbook for classes in medical entomology, but the practitioner will also find it a valuable and an authoritative reference text. It is one of the best on the subject available, and up to date.

LEONARD HASEMAN

**Manual of Bacteriology and Pathology for Nurses**—By *Jay G. Roberts. (6th ed.) Philadelphia: Saunders, 1932. 259 pp. Price, \$2.00.*

As the title indicates, this is intended to be a textbook for student nurses. The section dealing with bacteriology reveals much evidence of inefficient revision. As an example, in some places streptococci are given as the cause of scarlet fever and in other places, this disease is classed with those of unknown causation.

However, such inconsistencies are slight as compared with some of the statements concerning bacteriological reactions and particularly those involving the subject of immunity. A few instances are too flagrant to overlook. The names applied to the various streptococci are confusing and certainly do not correspond with any logical nomenclature. It is hard to understand the author's division of bacteria on the basis of pus formation

as the reader would certainly conclude that this process was limited to the activities of the streptococci and staphylococci.

No mention is made of the occurrence of melitensis infection in the United States. It is unfortunate that typhoid vaccination is used as an example of the value of the opsonic index. Why should the plague bacillus be classed with the anaerobes when the organism is described as a facultative anaerobe?

Although the author prides himself upon presenting the latest material, the infective agent of yellow fever is stated to be *Leptospira icteroides*, and old terminology is used to describe the mosquito vector. Some little used methods for making the tuberculin test are described, but the Mantoux method is not even mentioned. Allergy and serum sickness are certainly not synonymous terms and should not be classed under the general title of "anaphylaxis," which term comes from the Greek and not from the German, as stated.

It might be possible to forgive many of the errors if the description of the Wassermann test was not so confused as to make it almost unrecognizable. On the other hand, most of the section on pathology is well written and quite correct. Even here, when the author reverts to bacteriological discussions, he is apt to slip. It would hardly be fair however, to leave the impression that the book is worthless. No such thing is intended. Much of the material is in such form that it can be readily assimilated by the elementary student. At the same time, it is hard to understand how so many errors can exist in 250 small pages.

JOSEPH A. KASPER

**Magazine Publishing**—By *Lenox R. Lohr*. Baltimore: *Williams & Wilkins*, 1932. 328 pp. Price, \$4.00.

Everyone who has the supervision of a publication, whether bulletin, pam-

phlet, or magazine, will find this a guide as to how to go about the myriad tasks which arise and which commonly have to be learned by experience or from that equally bitter teacher, the printer.

Mr. Lohr tells the editor how to manage his assistants, prepare his manuscripts and illustrations, and carries him through the whole process of deciding the most attractive and effective make-up and typography, besides introducing him to an intelligent comprehension of details of the printshop.

The chapter on editorial detail, including a page of proofreaders marks, will enable the editor to know and do what the printer expects of him. Mastery of its advice will insure good relations with those who must eventually carry every piece of printing to its final form in paper and ink. The book, though indexed, is not as well organized as it might be for grasping a desired bit of information instantly, but it does contain exact data regarding more of the innumerable tasks connected with publication than any other volume this reviewer has seen. FRANCES GRINSTEAD

**Student's Handbook on Nursing Case Studies**—By *Deborah MacLurg Jensen, R.N., B.S.* (2nd ed.) New York: *Macmillan*, 1932. 129 pp. Price, \$1.25.

The social phase of a patient's life is very often disregarded or little thought of in relation to his physical illness. Very often, as in the cases of some mental patients, the difficulty lies in their maladjustment to social conditions. In *Jensen's Student's Handbook on Nursing Case Studies*, the side of illness, its importance, its relation to the patient before entering and after leaving the hospital, are greatly emphasized and clarified in all types of cases.

This book is the only one of its kind published and should be in the hands of every nurse. RUTH ZINKAN, R.N.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Toxoid Replaces Toxin-Antitoxin**—An announcement of unusual import comes from the New York City Department of Health: "Improvements made in the preparation of diphtheria toxoid," its bulletin says, "have led the Department of Health to discontinue the manufacture of toxin-antitoxin and to use toxoid in its place." Advice about dosage follows.

ANON. Toxoid Instead of Toxin-Antitoxin. *Weekly Bull.* 21, 48:377 (Dec. 3), 1932.

**Rural Health Prospers**—Despite the financial difficulties of the times, county health administration made in 1931 the best record of recent years—a net gain of 59 new county units.

ANON. Extent of Rural Health Service in the United States, 1928-1932. *Pub. Health Rep.* 47, 51:2299 (Dec. 16), 1932.

**Aids Malaria Control**—Two studies in Alabama confirm the proposal that plasmochin administered to a population will lessen malaria because it renders the human carrier non-infectious to mosquitoes. This ought to please the anti-vivisectionists. In all seriousness, it suggests that the use of the drug is a valuable addition to our present methods of malaria control.

BAKER, J. N. and GILL, D. G. Plasmochin in Malaria. *Pub. Health Rep.* 47, 49:2245 (Dec. 2), 1932.

**Does Cancer Control Pay?**—The Massachusetts cancer program is evaluated and found to pay real dividends on the sum invested by the state. Stimulating.

BIGELOW, G. H. and LOMBARD, H. L. Economics of the Massachusetts Cancer Program. *New Eng. J. Med.* 207, 22:972 (Dec. 1), 1932.

**Random Thoughts on Milk-borne Sore Throat**—Two definite conclusions

are arrived at in this rather discursive paper: One, that there is a great deal that we do not know about streptococcus infections. Two, that unless it is possible to apply rigid precautions against mastitis, the only safeguard against septic sore throat is pasteurization. To both conclusions we can all agree.

BROOKS, P. B. Epidemiology of Septic Sore Throat. *New York State J. Med.* 32, 23:1348 (Dec. 1), 1932.

**Pneumonia and Heat**—Steel workers whose jobs subject them to extremes of heat and humidity have markedly higher death rates from pneumonia than do general workers in the same industry. Preventive measures are proposed.

BRUNDAGE, D. K. and BLOOMFIELD, J. J. The Pneumonia Problem in the Steel Industry. *J. Prev. Med.* 14, 10:345 (Dec.), 1932.

**Another Progress of Nutrition Report**—This annual statement of the progress of research in nutrition is unusually complete, making it a mine of information for the casual student of the subject.

BURNETT, F. L. The Progress of Nutrition. *New Eng. J. Med.* 207, 33:1040 (Dec. 8), 1932.

**Syphilis in Industry Again**—Three articles on methods of providing medical treatment for syphilis among workers through various industrial health insurance or health service schemes.

CLARKE, W. *et al.* Syphilis An Industrial Problem. *J. Social Hyg.* 18, 9:481 (Dec.), 1932.

**Does Age Lessen Industrial Value?**—This Chicago study of reaction times stresses the industrial use-

fulness of the man over 40. Persons in the age group 40-59 had fewer accidents and less absenteeism on account of illness than younger men.

FISHER, H. E. Are We Old at Forty? *Indust. Med.* 1, 2:78 (Nov.), 1932.

### Tonsils vs. Colds in Adults—

In a group of adults, some with and some without tonsils and adenoids, there was found to be no significant difference with respect to attacks of common colds between the two divisions.

GAFNER, W. M. Adeno-Tonsillectomy and Disease of the Upper Respiratory Tract (Common Cold) in Adults. *J. Infect. Dis.* 51, 3:489 (Nov.-Dec.), 1932.

**Rights to Potable Water—**Although this paper is a technical engineering and legal treatise, it succeeds in becoming a most interesting discussion of the use of potable water. It dwells largely with the celebrated Delaware River Case.

HORTON, R. E. Water Diversion Between Drainage Basins. *J. Am. W. W. Assn.* 24, 11:1623 (Nov.), 1932.

**Citius, Altius, Fortius—**About all that can be said concerning the value of physical education in its relation to general health culture and welfare here and abroad is said at its best in this extensive symposium.

LAPORTE *et al.* International Olympics Conference on Physical Education. *Physical Education Review* 3, 9:16 (Nov.), 1932.

**Faulty Fixtures—**Here are set forth the possibilities of contamination of water through faulty plumbing fixtures which permit siphonage through cross-connections and methods of testing.

MORRIS, S. B. Cross-Connections with Public Water Supplies. *J. Am. W. W. Assn.* 24, 11:1750 (Nov.), 1932.

**More About Vaccination Methods—**Smallpox vaccination by the intra-

dermal route is advocated after a four-year trial. The reactions are mild, and vesiculation and scarring were trivial or absent.

ROBERTS, B. E. Subcutaneous and Intradermal Smallpox Vaccination. *J. Prev. Med.* 6, 6:453 (Nov.), 1932.

**Salmonella Poisoning—**In this scholarly treatise on food poisoning, the author gives his reasons for assuming that the damage is done by undestroyed toxins produced by the salmonella group of organisms. He then gives the objections to this theory and ends with: "I have endeavored to deal impartially with this controversial subject, freely admitting that my views as to causation may be unsound, but giving you the reasons for the faith that is in me." Try to imagine an American writer closing his lecture with such an admission.

SAVAGE, W. G. Some Problems of Salmonella Food Poisoning. *J. Prev. Med.* 6, 6:425 (Nov.), 1932.

**Bacterial Dissociation in Epidemiologic Studies —**Do bacteria change in virulence by gradual adaptation during epidemics? The answer to this question will interest every epidemiologist. The paper must be studied to get any worth-while conclusion from it.

ZINSSER, H. and WILSON, E. B. Bacterial Dissociation and a Theory of the Rise and Decline of Epidemic Waves. *J. Prev. Med.* 6, 6:497 (Nov.), 1932.

**Bacterial Causes (?) of Caries—**Despite the fact that we are pretty sure about the dietary origins of dental caries, the bacteriological search for the cause goes merrily on. "*L. acidophilus* was found most frequently in the mouths of those children whose teeth contained three or more cavities." Hence some relationship appears to exist between the germs and cavities, concludes this author, even though he

reports the absence of the organism in many carious mouths, and its presence "rather frequently and consistently" in mouths without any dental caries.

TUCKER, W. H. The Possible Relation of Aciduric and Acidogenic Micro-Organisms to Dental Caries. *J. Infect. Dis.* 51, 3:444 (Nov.-Dec.), 1932.

**Courts Sustain Milk Regulations**  
Reviewing twenty recent court decisions about milk, evidence is presented that courts uphold all reasonable regulations and licensing statutes. There is a reminder here that defective legislation may be the basis for trouble to come.

TOBEY, J. A. Recent Court Decisions on Milk Control. *Pub. Health Rep.* 47, 49:2250 (Dec. 2), 1932.

**Medical Services for Mary Jones**  
—A skeptical medical profession is told how much the now famous program proposed by the Committee on Costs will do for the doctor's welfare. How the new and superior service will be rendered to Mary Jones is also set forth, but nothing is said about the method of inducing Mary Jones's father (and 25 million other fathers) to pay a rather high fee (\$36.00 per person) for services that may not be needed.

WILBUR, R. L. The High Points in the Recommendations of the Committee on the Costs of Medical Care. *New Eng. J. Med.* 207, 24:1073 (Dec.), 1932.

**Respiratory Diseases Menace Childbirth**—Despite surgical asepsis puerperal infections persist, the curve of incidence follows the incidence curve of respiratory infections at a somewhat later date.

WILLIAMS, J. T. The Relation of Respiratory Infections to Puerperal Infections. *J.A.M.A.* 99, 24:1992 (Dec. 10), 1932.

**The Last Word About "Committee on Costs"**—By far the ablest presentation of the proposals for socialized medicine. The problems are honestly and openly stated. For instance: if we are to invoke the insurance principle, we must guarantee the best medical care; provide the intimate service of the family physician, plus specialized aids: assure economy and efficiency. *Can we?* (Ed.) Although compulsory participation is the logical solution, the committee proposes experimenting with various voluntary schemes until the right way is found.

WINSLOW, C.-E. A. The Recommendations of the Committee on the Costs of Medical Care. *New Eng. J. Med.* 207, 25 (Dec.), 1932.

## BOOKS RECEIVED

HOOKWORM INFECTION. By Clayton Lane. New York: Oxford, 1932. 319 pp. Price, \$6.25.

HOW TO DEVELOP YOUR PERSONALITY. By Sadie Myers Shellow. New York: Harper, 1932. Price, \$3.00.

HABITS: THEIR MAKING AND UNMAKING. By Knight Dunlap. New York: Liveright, 1932. 326 pp. Price, \$3.00.

MEDICAL CARE FOR THE AMERICAN PEOPLE. The Final Report of the Committee on the Cost of Medical Care. Chicago: University of Chicago Press, 1932. 213 pp. Price, \$1.50.

A SUGGESTION FOR AN EXPERIMENTAL ATTEMPT AT LOCAL IMMUNIZATION IN POLIOMYELITIS

THROUGH IRRADIATION OF THE PORTALS OF ENTRY. By S. Peskind. Cleveland: Mount Printing Co., 1932. 15 pp.

THE SEX TECHNIQUE IN MARRIAGE. By Isabel Emslie Hutton. New York: Emerson Books, 1932. 160 pp. Price, \$2.00.

RECENT SOCIAL TRENDS IN THE UNITED STATES. Report of the President's Research Committee on Social Trends. New York: McGraw-Hill, 1933. 1568 pp. Vols. I and II. Price, \$10.00.

A STANDARD CLASSIFIED NOMENCLATURE OF DISEASE. Compiled by the National Conference on Nomenclature of Disease. New York: Commonwealth Fund, 1933. 701 pp. Price, \$3.50.

## NEWS FROM THE FIELD

### A.P.H.A. MEMBERS HONORED BY ROYAL SANITARY INSTITUTE

THE Royal Sanitary Institute of Great Britain has elected two of our members to Honorary Fellowship—George A. Soper and Mazýck P. Ravenel.

George Albert Soper is an engineer by profession, a graduate of the Rensselaer Polytechnic Institute. He received his M.A. and Ph.D. degrees from Columbia University. He has been a member of our Association since 1895 and is a Charter Fellow. He was the discoverer of "Typhoid Mary," the most famous carrier in medical history. He was the first to report an outbreak of influenza in the Army in 1918, in which he served as Major of the Sanitary Corps, and framed the 12 rules proposed by the Surgeon General and promulgated by President Wilson. From 1923 to 1929 he was Managing Director of the American Society for the Control of Cancer. For some years past his attention has been directed particularly to street cleaning and the disposal of garbage. He is Chairman of a joint Committee of the American Society of Civil Engineers to investigate the subject and to promote education in regard to it. He has taken interest in many civic affairs, and has had many positions of great credit and honor. He was engineer in charge of rehabilitation after the terrible storm in Galveston in 1900, and studied the epidemic of typhoid fever in Ithaca, N. Y. in 1904. He has also investigated the subway air in New York, and served as President and Director of scientific work of the Metropolitan Sewerage Commission.

Mazýck P. Ravenel, M.D., has been a member of our Association since 1899 and is a Charter Fellow. He retired

from the practice of medicine in 1893 and has since been connected with teaching and research work at the University of Pennsylvania, the University of Wisconsin, and the University of Missouri. He was the first bacteriologist of the State Live Stock Sanitary Board of Pennsylvania, and conducted the experiments which proved the danger of bovine tuberculosis to human beings. He was President of our Association in 1920-1921, and in conjunction with Henry F. Vaughan, took over the editorship of the JOURNAL in January, 1922, became Chairman of the Editorial Committee, December, 1924, and Editor-in-Chief in March, 1930, a position which he continues to hold.

The Royal Sanitary Institute has honored other members of our Association in the past in a similar way. We appreciate its action at the present time, and feel sure that it will further cement the very cordial relations which have existed between our Society and the Royal Sanitary Institute.

### CLEANLINESS INSTITUTE

CLEANLINESS Institute has arranged with the National Tuberculosis Association for the distribution of the educational materials created by the Institute for public use, through the association's state and local branches and affiliates. On account of a drastic reduction in the budget for its educational services in 1933, the Institute has been obliged to discontinue its own distribution of these booklets, school readers, posters, etc.

The transfer of this material from the headquarters of the Institute at 45 East 17th Street, New York, to the various state tuberculosis associations should be completed by February 25.



Health officials, schools, writers, industrial executives, public health nurses and others, may obtain this material from the association in their own state after this date. Hereafter, all requests for publications received by the Institute will be referred to the National Tuberculosis Association or to the appropriate state association.

The curtailment of the Institute's educational service has required also the discontinuance of the staff heretofore associated with this work. Under these circumstances, Roscoe C. Edlund, the general director, announces that the Institute cannot continue extensive correspondence, field service and detailed assistance, but that he will be glad to serve as far as possible in continuing Institute contacts. Mr. Edlund requests that all correspondence be addressed either to him or to Cleanliness Institute.

#### PSITTACOSIS

THE discovery that native birds of the psittacine family in California now harbor the disease "psittacosis," and that it is therefore no longer solely an importation was made by the California Department of Public Health under the direction of Dr. Karl F. Meyer, Director of the Hooper Foundation for Medical Research, San Francisco. Research into the prevalence, transmissibility, the carrier state in birds, and possibility of infection in birds other than psittacines, is now going on in the Hooper Foundation Laboratories.

#### PUBLIC HEALTH SURVEY

A SURVEY of public health work in Delaware County, Pa., will shortly be begun by Dr. Joseph W. Mountin, F.A.P.H.A., of the U. S. Public Health Service, through the coöperation of the county medical society, the county tuberculosis association, and other health and civic agencies. It will be the aim of

the survey to obtain accurate information on all health activities of the county, to formulate effective methods for preventing and combating epidemics, to coördinate the work of agencies in the health field, and to prevent and correct overlapping and waste of effort.

#### NEW MILWAUKEE HEALTH CENTER

THE Matthew Keenan Memorial Health Center, a gift to the city of Milwaukee by the late Matthew Keenan, was opened recently. The cost was \$150,000.

#### NATIONAL CANNERS ASSOCIATION CONVENTION

THE Twenty-Sixth Annual Convention of the National Canners Association, the Canning Machinery and Supplies Association, and the National Food Brokers Association was held in Chicago January 23-27.

#### PERSONALS

JAMES H. ELSON, who retired 10 years ago as Chief Inspector of the Health Department in Jamaica, Queens, New York, died December 1. He spent 20 years in the Health Department, starting as an inspector of the Bureau of Sanitation.

DR. OGILVIA C. RICKSECKER, of Wilmet, was appointed Health Officer of Stark County, Ohio, to take office January 1. He succeeds Dr. Floyd R. Stamp, of Alliance.

JOHN W. BROWN, M.D., member A.P.H.A., who has been Health Officer of El Paso for 5 years, is the new State Health Officer of Texas. He succeeds Dr. J. C. Anderson, F.A.P.H.A.

DR. P. HERNANDEZ LIRA, member A.P.H.A. has been appointed Director of the Training Station for Public Health Workers, sponsored by the Mexican Public Health Service and the Rockefeller Foundation.

## DEATH.

DR. LOUIS CANTOR, member A.P.H.A. since 1928, died January 10 in Jerusalem. He was chief sanitary engineer of the Palestine Government. Dr. Cantor was born in Syracuse, N. Y., gained his first engineering experience at the Panama Canal under General Goethals, and subsequently was an engineer for the City of New York. In 1918 he went to Palestine with the first contingent of the Hadassah medical unit and was placed in charge of the anti-malaria campaign there. He was 48 years of age.

## CONFERENCES

February 6-10, American College of Physicians, Seventeenth Annual Clinical Session, Montreal.

February 13, 14, Annual Congress of the Council on Medical Education and Hospitals of the American Medical Association, Chicago, Ill.

March 21-25, Fourth Pan-American Medical Congress, Dallas, Tex.

April, American Physiological Society, Cincinnati, Ohio.

April 3-8, New York Food and Health Exposition, Grand Central Palace, New York, N. Y.

April 4-6, American Water Works Association, Southeastern Section, Albany, Ga.

May 29-31, Western Branch A.P.H.A., Pasadena, Calif.

June, State and Provincial Health Authorities of North America, Washington, D. C.

June, State and Territorial Health Officers Conference, Washington, D. C.

June 11-17, National Conference of Social Work, Detroit, Mich.

June 12-17, American Medical Association, Milwaukee, Wis.

June 26-30, National Tuberculosis Association, Toronto, Canada.

July 1-7, National Education Association, Chicago.

July 5-9, International Union of the Protection of Childhood, Paris.

July 18-20, International Congress of Pediatrics, London.

July 10-15, International Council of Nurses, Paris, July 10-12; Brussels, July 13-15.

July 25-29, British Medical Association, Dublin.

July 29-August 4, World Federation of Education Associations, Dublin.

One year ago an investigation of the so-called Vice-squad in New York City created a wave of public indignation. Legislation was enacted so promptly to reform the situation that Mr. Waterman, who was about to publish the results of an extensive investigation which he personally had carried on, had to revise his findings entirely in order to bring his report up to date. The product of his labor is now ready, entitled "Prostitution and Its Repression in New York City (1900-1931)." The work should be of value to individuals and organizations interested in dealing constructively with the problem of prostitution elimination. Published by Columbia University Press, price, \$3.00.

## The American Journal of Nursing

It is not only the nurse executive or the nurse instructor who finds the *Journal* a welcome daily guide. The humblest, the most isolated, private duty or public health nurse loves it and uses it. We know, because she tells us.



\$3.00 A YEAR

*\$2.50 each in clubs of ten  
or more*

The American Journal of Nursing  
450 Seventh Avenue, New York, N. Y.

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

March, 1933

Number 3

## Mental Health of the Preschool Child\*

IRA S. WILE, M.D., F.A.P.H.A.

*Mount Sinai Hospital, New York, N. Y.*

ABOUT half of the hospital beds in the United States are utilized by victims of mental and nervous diseases. It has been estimated that approximately  $4\frac{1}{2}$  per cent of the total population of the United States will, some day, be in a hospital for mental diseases. The State of New York sustains an economic loss of \$130,000,000 annually as a result of mental disease.

Without tabulating the numbers of mental defectives, epileptics, neurotics, and psychotics, it is patent that the mental health of a community should play a definite part in any public health program although, up to the present, it has received comparatively little attention from public health officials or in the AMERICAN JOURNAL OF PUBLIC HEALTH.

For too many years health has been regarded as a term relating only to physical well-being. In its broad connotation, however, health is more than a state of optimum activity of the physical organization of man. It is rather a state of well-being that enables him to live most and best and to realize his functional potentials. Men-

tal health is part of the unity of life and it involves a consideration of the welfare of people in terms of their satisfactions, their services, and their human relationships.

Mental health at all periods of life represents the healthful operation of mind. It encompasses the subjective side of life. Mere existence is valueless; consciousness of existence determines whether or not life is worth while. Preschool age children are as much concerned with their own subjective reactions as any other members of the community, even though they may not possess an understanding of their own potentials or realize the meaning of social adaptation. Whatever is to be done in the realm of preventing mental disease, whether by public enactment or private efforts, it is obvious that infancy and early childhood afford the richest opportunities for constructive service.

The public health movement is concerned primarily with the field of prevention. In so far as various diseases play a part in diminishing the mental health of children, the psychiatrist is in harmony with all efforts to diminish those diseases which lower the physical vigor of the communities and undermine the mental stability of their citizenry.

---

\* Read at a Special Session on Mental Hygiene of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

No therapist would deny the tremendous mental factor existent in treating various patients suffering from tuberculosis, syphilis or orthopedic deficiencies. No one could gainsay that all public health efforts to control tuberculosis and syphilis, rachitis, diphtheria, poliomyelitis, and other diseases in infancy, safeguard mental activity as well as physical soundness. Everyone will concede the physical and psychical significance involved in the prevention, palliation, and cure of sensory and motor handicaps, whether strabismus, epispadias, or webbed fingers; whether an intra-uterine amputation, a congenital cataract, or an ophthalmia neonatorum. Body and mind—there is mind in body and body in mind. The mental health of the preschool child, therefore, involves at every level the preservation of his physical well-being, as a primary factor in establishing the potentials of normal psychical living.

The preschool child occupies a temporal position between infancy and school attendance. But the line on either side delimiting his status is not sharply drawn. His mental health involves the events preceding the age of 2 years and the shadow of the events which are to occur at the age of 5 or 6 years. The psychic well-being of the preschool age child is bound up in such problems as are concerned with the prenatal care, maternal mortality, rational spacing of pregnancies, adequate obstetric attention, and a lessened use of forceps, especially among primipara. Convulsions and mental retardations involve work, not merely with cripples, but with immense problems of psychic rehabilitation in order to secure a reasonable adjustment to our rapidly moving life. It is obvious that mental health is not a thing completely apart from physical well-being. The child with a brachial paralysis, a hemiplegia, or a traumatic strabismus, is a sufferer

*in toto* as well as *in loco*. The treatment of the injury is a thing apart from the treatment of the injured, and both are interwoven with mental hygiene.

The fact of birth itself is a psychophysical factor, in so far as it subjects the child to physical strains and cerebral pressures, and it may occur in a psychological atmosphere which may be disadvantageous from many angles. The death of a mother in childbirth alters the status of the potential mental life of the child. The maintenance of family life or the presentation of an adequate substitute, therefore, plays a part in fostering mental health. I am not interested at this particular moment in discussing the very important familial limitation of offspring with reference to the mental health of children. But it is fair to remark that many of the mental maladjustments of preschool age children arise from their psychological reactions at being unwanted, neglected, or abused for reasons not understood by themselves, but which play a part in the emotional atmosphere of the home into which they have been born. Some children are actually penalized by their own birth, and they react with forms of aggressive behavior not dissimilar in kind to those exhibited by their noisy elders when thoroughly conscious of their own rejection.

It is manifest that an intelligent home and an educated parenthood offer far better background for the development of mental health than a home of ignorance, brutality, instability, and disorganization. Frequently tantrums, enuresis, night terrors, somnambulism, excessive lachrymation, restlessness, irritability, whining, and sulkiness are symptomatic of home activities or inactivities out of harmony with rational child training.

The preschool age is of the utmost significance because it is the period of life when the main mechanisms evolve which are concerned with human de-

velopment. It is the period of neurological life during which myelinization occurs, permitting the organization of new associations, the limitation and direction of capacities, the acquisition of experience, and the development of character trends. Mental deficiencies become more evident and their management by medicaments or education calls for diagnostic judgment and therapeutic guidance. The early detection of potential school retardates, institutional types and economic ineffectives, enables society to provide the intelligent care and resourceful training that advances the mental health of the children and protects the later social welfare of the community.

Primarily the preschool age is one of personality expansion, or, one might even say, the period of personality cohesion. Consider the evolution of locomotion, speech, manual activity, emotional experience, and social intercourse, and their mutual interactions as well as their interplay in the personality in the making. All of these developmental functions play a part in laying the fundamentals of mental health of the preschool child.

First, in order of importance, I should lay stress upon the age of habit formation. There enters into mental health the factor of habituation whether to one's own visceral activities, to one's own ego, or to social life about him. Hence mental health is manifest in the development of adequate and acceptable habits with reference to food, to the excretions, to sleep, and to the genital areas. If one thinks of anorexia nervosa, enuresis, pavor nocturnus, and, masturbation, one immediately senses a disturbance of psychic equilibrium. Such habit reactions give evidence of incomplete adjustments to life. Underlying difficulties may inhere in faulty training by parents, in an action of revenge, or in a response to a feeling of fear, or to some insecurity arising from

parental, mainly maternal, indifference or ignorance. The development, therefore, of intelligent parenthood with reference to basic habits possesses fundamental values. Public health functions best through education. Knowledge concerning correct habits and the hazards of somatic irregularities is more useful socially than information concerning vitamins, or poliomyelitis, sera, or the treatment of chronic arthritis. The prevention of a phobia, a revenge motive, a sense of personal inadequacy, may lessen the future prevalence of neuroses, psychoses, delinquency, and crime.

The preschool age should be regarded from its developmental angle. I need but call attention to the variety of experiences which play a part in the evolution of personality. The development of locomotive stability, the necessity for visceral balance, the significance of nutritional equilibrium with an adequate amount of vitamins and minerals in the dietary, the growth of endocrine harmony, the natural development of hand preference, the active immunization against infections, protection against traumatism, all play a part in safeguarding not merely limbs and viscera but in determining the mode of life which the child is to enjoy and to which he is to react. The originally left-handed child who is forced during this period to become right-handed later may evidence his disability in stuttering and may find himself further penalized psychically by an increasing speech difficulty and his growing fear of his own limitation. Thyroid and pituitary disturbances manifesting their influences upon body growth and mental activity may become the basis of incapacities subversive of normal mental function. The public health representatives have unusual opportunity for locating preschool age children with developmental difficulties and in inaugurating a program for their welfare.

While I have mentioned both habit formation and developmental difficulties from the mental standpoint, this pre-school era of psychic reaction is of transcendent importance. This is the age of developing speech, of interchanging ideas, of testing out one's universe, of experimenting with the environment, of exercising the pioneer trait of curiosity and seeking satisfaction from and for it. This is a period during which, to a large extent, the interests of the child and the adult are not identical because their worlds are not identical. It is the age for the child to discover his own ego and to find himself as an individual—a person and an individuality—working in a world dominated for the most part by creatures of a larger growth. These, including parents, relatives, and other well wishers, desire to guide him and bring into his life the “musts” and “don’ts” that are so often in conflict with his desires and purposes. From the combination arises an assortment of conflicts, some light, some heavy, some superficial, some deep, some conscious, and some finding their habitat in sub-consciousness. They may emerge as tantrums, cruelty, tics or hysteric behavior, maladjustment, exaggerated activities, and neurotic reactions.

Fundamentally, however, mental health is not a matter of anatomy, nor is it primarily a matter of intellectual endowment. It is rather one of reactivity and reaction to a universe in terms of feeling. I shall omit reference to hereditary traits in neuropathic, defective, and originally diseased families, and consequent mentally dysgenic familial pressures, save to note that the locating of such families is a reasonable public health function in the interest of a program to foster the mental health of a growing generation.

The preschool age affords an abundant opportunity for the evolution of emotional trends. In self-occupation,

in efforts to secure independence, in contactual experience with brothers and sisters, parents, nurses, and the world at large, the child finds the agreeable and disagreeable. It is not necessarily a pleasure and pain alternative, but nonetheless there is a definite unfolding of some basic emotional mechanisms. His personality has to depend in a large measure upon the fundamental bonds of his primitive emotional life. Phylogenetically, emotional and reflex action antedate intellectual and purposeful activity. If one considers merely such reactions as appear during fear, he appreciates that the over-development of fears during this period of life leads to a contraction of the ego. While rage may lead to ego expansion and aggressive activity, the inculcation of fears and the temporary experience of incipient states of terror rob personality of its security and diminish the stability of the self. Fear devastates the spirit within and may show comparatively few effects to those round about; rage may dissipate its energy upon those round about and leave but a small trace of its damage upon the being within. Fear is more directed at one's own self, while rage expends itself more upon others. Love and hatred as positives and negatives, find themselves bound up with fear and rage in determining the nature and extent of mental health during this early period of personality formation.

The emotional unfoldings together with the conscious recognition of one's own capacity to evidence emotions, combined with reactions to the emotions of those about one, involve social experiences of all kinds.

Preschool life involves almost the maximum contact of parents and siblings. Most of it grows out of the home itself although much is found in the interactivities of recreational life. There enter likewise the beginnings of self-selection of friends and playmates, the sensing of likes and dislikes, the

attitudes toward games and sports, the selection of interests and occupations. In addition, special contacts occur with doctors and nurses, public health workers, social workers, teachers in nursery schools, as well as parents, grandparents, relatives, boarders, friends, visitors, and workers about the home.

Vaccination, immunization, an enema, irrigation of the ears, colic, a blister, a tonsillectomy are physical events with subjective values but they are less important than what happens to the child under conditions of discomfort and distress. The fact is equally true for rewards and punishments at all ages. No contact is devoid of experiential value. No experience can be wholly negative in character. Whatever happens is a stimulus to which the child must respond. He is conditioned by the world into which he is received, as well as by the parents who have passed on to him certain hereditary determinants. His life, therefore, is dynamic. He is essentially labile; and inactivity during this age places him upon a vegetative rather than upon an animalistic level. He lacks the independence of the young animal but he has the advantage of associative memory, multiple choice, and a capacity for changing interests and enthusiasms. His mental health involves constant adjustment and adaptation. He is continuously testing his power and worth in terms of his limited but increasing ability to cope with life. His home is an island which gives him reasonable security, but he would cross the strait and start an adventure on the main land of life.

Much of what the school child is to be depends upon these early interactions. How far is maternal overprotection to harass him, lessen his confidence, and sap his psychic independence? To what extent are false parental attitudes to hamper his natural development? To what extent is he to

be merely an instrument for parental pleasure, parental satisfaction, or for parental expiation? To what extent is he to be in competition, always compared with someone else to make him feel his limitation, his inadequacies, his inferiorities? To what extent is he to be penalized by a lack of opportunity, by vicious patterns, by cruelty, by personal abuse, and by witnessing marital infelicities? To what extent is he to be the victim of misunderstanding and repression? To what extent is he to be the victim of parental fears, disappointments, and vicissitudes? Is he to be merely a toy, an outlet for parental emotions, a comfort and solace, a satisfying but spoiled object of manifold solicitude? How far indeed is he to be regarded as a person rather than a thing, an organic being rather than an object in the house? Such questions are vital in considering his responses, his habits of mind and thought, and his behavior reactions. They are to affect his character, his health and his happiness.

Mental health involves the cultivation of a few fundamental principles and practices. Personality as a unit consists of the interaction of numerous trends. The estimation of what constitutes mental health is a matter of social opinion. Majority opinion constitutes normality. The norm of mental health involves a reasonably broad band of activities which do not pass beyond those vague limits which are held to be the beginning of behavior detrimental to others. These standards vary in communities, and even within communities according to accepted levels of behavior of families. Lying would be regarded by one family as an evidence of mental ill health and by another as natural, normal, and expected. In one group stealing would represent a fearful and fear instilling state of mental disease, whereas in another it would be deemed part of

experience, reasonably common and without a hint of mental deterioration.

Strangely, most forms of behavior which are aggressive in character and represent a profound effort to grapple with life's situations are held to be more pernicious than the tendencies to sit apart, to be quiet, self-amusing and hesitant, if not absolutely shy with others. A balance between extravert and introvert trends obviously is more advantageous than an extreme expression of either one of these personality trends. The experience of child guidance clinics amply illustrates that parents regard as evidence of ill health those characteristics which, for the most part, interfere with parental comfort and the generally desired peace standards of the household.

Every form of behavior must be regarded as purely symptomatic, as representing the activity of the total biologic social organism. One should not consider the mental health of the preschool child with a segregated reference to his physical well-being, or his intellectual potentials or his emotional trends or his social relations. It is the totality of these which enters into his thinking and doing, into his reactions toward what he wishes and what he wills to do, as well as into his positive or negative attitudes toward the desires and demands of those round about him.

One sees very little of epilepsy, and still less of psychoses among preschool children. Mental deficiencies vary in degree at this age, whether they are congenital, acquired as a result of birth traumata, or due to the dwarfing or warping of the personality during this primary period of development. The emotional conflicts and struggles which are incidental to youthful experience are part of the trial and error experiment that is determining capacity to adjust to both success and failure in life. This is a period of adjustment not for school life but for all life. In it are laid those

foundations whose values will be determined while grappling with the intellectual life of schools and experiencing the emotional life of adolescent love affairs, as well as in revealing their capabilities for adult adaptation. Mental health, therefore, calls for primary consideration, not in terms of psychoses, even though some of the seeds of psychotic conditions may be planted during these early years, but in terms of constructive factors that integrate the personality.

The preschool child who is allowed to cultivate his independence, who is encouraged in attention, persistence and coördination; who is aided in the establishment of habits of order and regularity in function; who is given an opportunity to play and to share with other children; who is given a variety of helpful parental patterns; has the finest opportunity for building up normality in mental health to the time of school entrance.

The preschool child must not be regarded as an isolated individual. His mental health is a continuum, probably extending from the moment of conception until the time of physical dissolution. A single age period has been set off arbitrarily as representing the period of the preschool age. One merely glimpses at this period of 4 years and finds that it is a period of rapid change. It is an age during which his physical growth is not marked by great increases in height or weight. Between the ages of 2 and 6 years he gains little more size or pounds than between the date of birth and two years but his psychic growth, rapidly advancing, is transcendent in importance.

During the 6 years prior to school entrance the child learns more, acquires greater power, develops more mechanisms, and brings into harmony more strains of his personality than he will ever again organize in a similar period of time. Even bearing in mind the



tremendous new drives and emotional advances that are related to the development of the gonadal system during adolescence, one can safely say that the preschool period is the fundamental time for promoting mental health. It is a period of latent sexual pressures but is not without sexual influence in experiences. It is the natural age for establishing right habits of action and of reaction; for promoting social friendliness with a full consciousness of one's own personality; and for fostering a sense of values in terms of adaptability and adjustment.

Preschool life affords ample bases for achievement, for meeting success and failure, for cultivating independence, for learning leadership, for promoting initiative, and for finding that wholesome balance between aggressive-

ness and submission which characterizes social adequacy. These are factors in, as well as functions of, mental health, whose foundations are to be laid in the preschool age before the social instrument of education with heavy hand endeavors to mould the plastic resourceful child to a single pattern of nonresistant, obedient, conforming childhood.

Public health officers can accomplish much by broadening their concept of health, by enlarging the scope of their protective and preventive activities so as to include within their dynamic functions the enrichment of life. This would be far more consequential to mankind than merely extending the expectation of life. To live is more than to exist and mental health is more than physical well-being.

---

## Paper-Reading and Discussion

. . . The fact is, when people get to a certain age—not so great an age, either—they do not go anywhere to listen: they go to be critical and to talk: not to hear of the experiences of others, but to tell their own. For the young and the enthusiastic this is rather pitiful. It is so very hard to learn that the real secret of writing papers is not putting things in, but leaving things out. . . . The time occupied in impressing the extent of the erudition of the audience upon the audience should never on any account exceed 20 minutes at the very outside. Only the smallest amount of ground should be covered,

and the minimum number of ideas uncovered. Of these, only a few should be discussed at any length. To an audience the most attractive contents of a paper are those read into it by the audience. A set lecture is an entirely different thing, of course. The audience here is either prepared to concentrate for an hour or ready to endure boredom for that period. Speaking generally, a society meeting is no occasion for a lecture. A 20-minutes talk is what is wanted: unless, of course, one is a named contributor to a symposium, when 10 minutes should be the utmost limit.—*Pub. Health*, Jan., 1933, p. 130.

# Are the "Nerves" and Badness of Childhood of Any Importance to the Field of Public Health?\*

ESTHER L. RICHARDS, M.D., F.A.P.H.A.,

*Associate Professor of Psychiatry, Johns Hopkins Hospital, Baltimore, Md.*

THERE are two reasons why I hesitate to use the phrase "mental health of childhood" before a group of physicians: First, the term mental health seems to make a distinction between health of mind and health of body; whereas in the reality of practice we cannot divide a human being into mind and body. We deal with health problems of individual child and adult as a total unit. Second, the term mental health is apt to carry commonly only one association—the intellectual development of child and adult, and this is a matter which public health physicians and doctors in general consider the business of departments of education. Suppose we discuss these two issues for a moment, and then pass on to some concrete examples of poor child health in the form of nerves and badness which the school child exhibits.

Health is an expression of the human being in action. While theoretically we may discuss the functioning of individual physiological systems of the body, we are quite aware that they do not exist in majestic isolation. The gastrointestinal system, for example, is so intimately associated with the cellular activity of the body as a whole that we cannot talk about digestion and metabolism and excretion except in

their relation to the total functioning of the organism. In like manner the structure and organization of the nervous system must be taken into consideration as much by the specialist in circulatory conditions, as the functioning of the circulation must ever be kept in mind by the neurologist. In short, a human being functions as an exquisitely integrated organism, every cell of which is dependent upon the behavior of every other cell. We know very little about the intricacies of these relationships.

In spite of the great advances in specific tests of a chemical, biological, and psychological nature, the reaction of the individual to the tests of life is still very much of a mystery. Why some people remain thin and others fat, some are bright and others stupid, some phlegmatic and others alert, in spite of heroic attempts at modification, are matters that intrigue us now as much as ever. We know that the constitutional endowment of a human being—intellectual, biological, temperamental—is a very definite and rather unmodifiable matter to deal with.

Only the youthful enthusiast wastes much energy in arguing whether it is environment or endowment that is the determinant of mental and physical activity. The rest of us prefer to adopt the more constructive approach of trying to find out what kind of environment and developmental assistance

\* Read at a Special Session on Mental Hygiene of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

offers any given constitutional endowment its best chance of development. This is certainly the goal of preventive medicine, which has acquired a wealth of knowledge concerning the antecedents of malnutrition, bone deformities, heart disease, tuberculosis, and predatory bacterial enemies that lie in wait for childhood all along its journey. One has only to travel in other countries and see the toothlessness of young men and women to be consumed with admiration for the great work achieved in our own country in spreading the gospel of oral health alone.

It is because of the great results achieved by an intelligent campaign against the forces disorganizing biological growth and development that I am so eager to have preventive medicine include in its plans an equally concerted program against that seriously increasing menace of our national health—nerves. Nerves constitute a kind of poor health that we as physicians pay little attention to until it reaches the stage of hospitalization. Again and again we hear without concern statistics gathered from reliable sources which tell us that “nerves” called “neuroses” and “psycho-neuroses” constitute at least 50 per cent of cases coming to the specialist and general practitioner; that there are more patients in public and private psychiatric hospitals in this country than are found in beds occupied by patients suffering from all other disorders put together. Why have we ears but fail to hear the prophetic warning embodied in such statements? The reason is not complex. We are afraid of the whole topic of “nerves” because we do not know about this field.

Back in medical school the anatomy and histology of the nervous system is usually presented like a dose of catechism. With this bad taste of first and second year in his mouth, the third and fourth year student approaches his

clinical neurology with the profound hope that he may pass the course if he can memorize the last chapters of Osler's System in a more or less ritualistic manner.

Those who took part in training medical officers for service in the neuropsychiatric division of the A. E. F. were amazed at the ignorance shown by the average candidate with regard to making the simplest kind of neurological examination. And if such a condition exists concerning the fundamental principles of nervous system organization and structure, how great is the gloom when the physician is called to consider the psychological aspect of “nerves.” A dash of endocrinology, and focal infection theories, with a sprinkling of Jung and Freud completes the salad of words and not facts.

Nerves increasing under the pressure of our high powered civilization are being passed for treatment from the hands of pediatrician, general practitioner, and public health officer, to the jurisdiction of cults and sects and behavioristic academicians with the word “clinical” in front of their names. Now, there is nothing about the subject of nerves too deep for the grasp of any earnest and honest seeker after light. It is not necessary to read all the literature poured out on this field of health. If we wish to become intelligently aware of a few essential principles in other fields of medical science, we find time to take postgraduate work here and there, and to get a list of a few good books on the subject. The physician who works with children in private practice or in school health organizations has the greatest of all libraries and laboratories at his disposal—the school-room—if only he is interested enough to use it. Here is the place where one can see the nerves of the coming generation developing.

“Nerves” are in every instance a reaction to strain of one sort or another,

and their treatment must be directed toward modifying this strain. The symptoms of nerves in the school child cover a wide range of complaints many of which take us into the realm of what is ordinarily called conduct. Whenever a child annoys or disturbs his environment we think of his activity as conduct to be judged instead of behavior to be interpreted, and consequently focus our attention on trying to stop the conduct instead of trying to find out why he acts as he does. For example, here is a cross-section of complaints studied last year by a health officer in two of our Baltimore junior high schools. They are symptoms of strain manifested in 79 students of both sexes—

Easy tearfulness

Nervous stomach with occasional nausea and vomiting during school hours

Headache and dizzy spells

Impudence to teachers

Refusal to do homework

Irritability and grouching when criticized

Falling asleep in school

Laziness, inattentiveness, chronic truancy

Child complains of funny feelings in the head and says she cannot think.

Spells of saying queer things in school which she claims she does not remember afterwards

Child is unable to concentrate, flies off at the least thing, steals from her mother, is boy crazy.

Fits and screaming spells

This pupil is sullen and dull, has done well in school up to this year but now refuses to work.

Katie seems to be in a daze, goes to lavatory frequently, seems to have undue influence over younger classmates.

John is hopelessly slow in school, and does not follow directions.

May trembles and cries when called on in class, and says she feels sick all over.

Jane complains of weakness in her stomach and throat and has attacks of flushing in which she gasps for breath and says she is dying.

William has spent 4 terms in the 7th grade, now stays by himself a great deal to avoid teasing. is aggressively defiant towards teachers, is suspected of stealing but denies it with tears.

Here are complaints familiar to every teacher from kindergarten on. but she

usually does not mention them to the school physician because he is not interested in them. Moreover, if the physician examined such a child and found no physical defect, he would in all probability be as puzzled as the teacher.

The first step in studying the nature of the strain responsible for such symptomatology is to find out as much as possible about the stuff of which the child is made—intellectual, biological, temperamental. Fortunately psychology has put at our disposal in the group and individual intelligence tests and in educational tests a means of finding whether a child is adequately fitting the grade to which he is assigned. Discrepancy between intellectual ability and school programs and home expectations is one of the commonest sources of child nerves. A child who is forced to cope with a course of study beyond his ability will do one of two things, depending upon his temperament. If he is phlegmatic and easy-going he will quietly evade issues, play truant, hold up signing of report cards, and not infrequently drift into delinquency which is much more entertaining than the schoolroom. If he is sensitive, conscientious, timid, he will fret and worry over his failures to measure up, and not infrequently develop headache, nausea, fatigue, etc., as unwitting body protests against life as he is called upon to face it.

What can the school doctor do about situations like this? They are, to be sure, the job of departments of education. At least he can be so aware of the situation that he can place the facts of the strain frankly before teachers and parents that something may be done to lower standards and let up on the nagging. In large city schools intelligence tests are routine in the first grade, but frequently they are not repeated for several years on the supposition that the intelligence rating of early child-

hood will go on to adolescence. In rural schools there is frequently no intelligence testing, the teacher deciding in her own right whether a child can or cannot do his work. Then again there is the custom of promoting on trial, or advising summer school for children who have failed their grade. Too often this forcing is not so much the fault of the school as of parents who insist on son or daughter being promoted to satisfy family pride. The easing up of strain on such children may come through transfer to special class or opportunity class, or transfer to vocational or pre-vocational school. Or, if no such relief is available in a school system, removal of the child from school at the earliest possible moment the law allows with recommendation for work permit is far better for his mental health than continuance year after year in an environment saturated with failure and discouragement. In the 79 school misfits referred to it was found that the "nerves" of two-thirds of the group represented the strain of intellectual inability to meet school demands.

In studying the nature of a child's biological endowment the physician has many tests of science at his disposal, and yet perhaps his most valuable ally is a careful and painstaking study of empirical facts gathered from following groups of children on through adolescence. The best illustration of this fact is to be found in the data coming from the White House Conference on Child Health and Protection. When this body, consisting of 1,000 experts in every sphere of child welfare, pooled their findings after a year or two of work, one was surprised to realize the difficulty they had in agreeing upon such an apparently simple thing as what constitutes a state of nutrition.

We crave some quick and concrete method of standardization, especially in the biological field. As a matter of

fact the more thoroughly we go into that sphere, the greater individual variation appears, and the more complex becomes cellular relationships. We know from experience that certain types of structural organization stand strains of life poorly, and yet we cannot determine why. Childhood organizations, prone to tics and easy vomiting and asthma and eczema and persistent enuresis and night terrors and stammering, is human material that cannot put up a sturdy fight against handicaps of severe physical illness or intellectual strain, or a wealth of excitements and poor social conditions that another kind of constitutional endowment would not notice.

Pediatrics is studying these children with reference to finding means of desensitizing them when they are found to react to any one protein. It is an excellent point of approach provided that as physicians we also study ways and means of desensitizing these children to environmental situations that upset their emotional equilibrium. In such patients we almost invariably have restless, over-conscientious, often timid and extremely sensitive temperaments. We cannot make them over, but by recognizing their problems in early school years we can help them to learn to live with themselves better in years to come, and undoubtedly reduce their chances of being nervous breakdown liabilities.

Children with such neuropathic constitutions react poorly to speed tests, and competitive struggles of athletics or academic work with prizes and awards. Many of them are intellectually precocious, and find themselves the pride and joy of teachers who are eager to have them do extra work and skip a grade, or to add summer school to a school year that has already proved exhausting, or to push them into public speaking and school plays. The child himself shrinks from these things, but

goes on with the plans because he wants to please teachers and parents. It is impossible for the layman to distinguish between child reluctance born of a constitutionally unstable nervous endowment, and that associated with laziness or adolescent rebellion against life in general.

Such problems do not come to the school physician for decision until the child, bending beneath the strain of over stimulation, develops multiple tics, or functional choreiform movements, or stammering. Then the medical prescription is usually to take him out of school and make him rest as much as possible. What the child needs is not withdrawal from school, but easing up of the school load. Taking such a one out of school breaks up habit routine upon which he thrives, and focuses his attention upon himself as a weakling and nervous invalid—a concept that may stay with him all his life.

Another serious nervous handicap belonging in this group is stammering. Stammering may begin with the onset of speech in the preschool child, and in 9 cases out of 10 will disappear in a short time if the environment completely ignores the matter. It may begin suddenly in the school child or adolescent following a fright or other serious emotional upset, or it may come on gradually under a period of strain at home or in school. Often this type of stammering is accompanied by jerking and twitching and respiratory tics. Stammering is a condition that is usually treated with speech training by the department of special education. The objective of speech training is to teach the child a technic of coördination between breathing and articulation. The stammering child needs something more. He needs an understanding of the sources of strain from which his stammering arises, and he needs help in learning to manage his emotional life. Hand in hand with technics of

coördination must go a knowledge of this individual child and his home and school setting.

I have mentioned some of the general sources of nerves in the school child that pass unnoticed because of their frequent occurrence. To teacher and parents they are of interest chiefly because of their annoyance. To the physician they should be of interest because they are harbingers of poor health that he and his colleagues will be treating long after the school period is over. The child and adolescent well started in habits of nervous instability are as seriously handicapped for self support, and family formation, and wholesome civic relationships as if they were suffering from handicaps with lesional pathology.

We have in our educational and child welfare organizations the set-up for giving every school child the benefit of an all-round study of health conditions that affect him, but we cannot do this properly until there is more coördination between departments of health and departments of education. The doctor needs to have an intimate knowledge of the problems of the schoolroom, and the teacher needs to have a larger concept of health education than is now hers, and both doctor and teacher need more knowledge of the homes from which school children come.

Parent-teacher association is doing a good work, but it does not reach the individual child. Last winter when speaking at a Parent-Teacher Association meeting the principal said to me,

The mothers who need health talks most are not here tonight. We can never get them to take part in our meetings. We teachers have not time to visit them, and they never come to visit the school except to complain about something.

One cannot expect our over-worked school nurses to get social data in their hurried visits. Here is the function of the visiting teacher—to acquaint school

with home and home with school. Years ago when teachers boarded around and there were family doctors, the community was acquainted. Today under the complexities of modern living all is changed to a status of mass production in health, in education, in social relationships. We cannot change these conditions, but we can work out some coördinated plan by virtue of which health problems of the individual child are not lost sight of in our ministration to the group.

The children handicapped by motor disability, defective vision, hearing, speech, and intellectual retardation are the educational problem of departments of special education in which psychologists and teachers expert in the pedagogy of specific handicaps plan and work with them. Except for examination of the specific physical disability, the school doctor has no contact with these children so far as interest and inquiry into the way they are adjusting themselves to these limitations is concerned. He could learn a great deal if he knew them better.

The futile struggle to adapt one's self to a world cut off by the elimination of a special sense organ, or the ability to achieve locomotion, reacts on the personality of the handicapped in a great variety of ways, depending on his temperament—whether he is ingrowing or out-going—and upon the opportunities which environment offers for self-expression. A wholesome start in the childhood of these human beings determines the trend of their entire lives.

The teacher cannot do it all. She needs the interest and intelligent helpfulness of the physician who has a concept of health that is not limited to the technics associated with his particular specialty. Public health cannot afford to ignore the behavioristic aspects of its field of service. The burden of its neglected opportunities falls back

inevitably upon nation, state, city, and rural community in the form of chronic dependence, state hospitalization, organizations for dependent and neglected childhood, penal and correctional institutions; yet schools of public health and hygiene have practically no place for the study of mental hygiene in their curricula.

As lay and professional people we have always been keenly interested in the welfare of children, but our interest has been more or less desultory and uncoördinated. It has been an interest more philanthropic and religious, than an interest associated with any scientific inquiry into the nature and needs of childhood. The dependent and semi-dependent child we have thought of as needing food, shelter, and clothing, and a certain amount of "schooling," but we have paid comparatively little attention to the best interests of these children as individual boys and girls.

Year by year medicine and education, and the behavioristic sciences of psychology and psychiatry have been driving home to us the fact that the mental, physical, and social health of the adult life of every community must begin with an intelligent and constructive interest in the story of the individual child.

Child-caring organizations are drawing away from the institution as a unit of ministration to the dependent child, and declaring themselves in favor of the boarding and foster home. The family is after all the basic factor of community life, and the child who does not grow up with the consciousness of being a part of a family group misses something that institutional life cannot supply. Hence modern social science is spending a great deal of time, money, and thought in keeping families and homes intact, and in trying to study the social, economic, and health forces which tend to undermine the stability of the home. Here are matters that come within the

# Mental Hygiene of Adolescence\*

WILLIAM A. WHITE, M.D.

*President, Institute of Mental Hygiene, Washington, D. C.*

THE subject upon which I am asked to speak does not necessarily serve to confine me to the limits that would ordinarily be indicated by the title of my paper. When I was asked to talk to you on the subject of the Mental Hygiene of Adolescence certain things suggested themselves to me which I conceive to be of importance and those are the matters which I shall discuss.

In the first place, I think I state a generally recognized truth when I say that adolescence is a period of especial stress. This is because it is a time when the instinctive tendencies assert themselves very strongly and at a time when the individual is expected to conform to the social conventions. As a matter of fact, he has had very inadequate experience. He has not accumulated wisdom, and he has not had the time to acquire self-control; so he is faced with the necessity of conforming when it is pretty apt to be beyond his powers to do so. I am sure that this state of affairs must be pretty generally known, and yet it is never taken into consideration, at least by the law.

A very large proportion of delinquencies occur at this time, and a not inconsiderable number of very serious crimes are committed. Homicides are by no means infrequent, and I am sure that prison wardens would tell you that this is the period when serious crimes are most apt to be committed, and when men and women first enter upon their

criminal careers. A judge who told me that he had just sentenced a 14-year-old boy to be hanged for murder, and went on to explain that the boy knew the difference between right and wrong and that was all there was to it, illustrates in a rather tragic way the total lack of understanding which so frequently faces the young adolescent when he gets into trouble.

The difficulties of the adolescent, whether they be delinquencies or mental illnesses, cannot be understood without appreciating the undue burden of instinctive urges with which he has to cope at his period of life. We can therefore think of him in terms of these instinctive tendencies and his capacities for dealing with them in accordance with accepted standards of conduct. Either his instinctive tendencies are too strong or his self-control is too weak, or both, when he gets into trouble.

But let me interject at this point a suggestion which I think is always helpful in understanding these situations. A boy whose instinctive tendencies are not strong enough when he is an adolescent to get him into more or less mischief is a boy whose equipment for life is lacking in the necessary energy to carry him very far; or, to put the thing a little differently, the goody-goody boy, the boy who never makes any trouble, who has all of the virtues and none of the vices, is pretty apt to be fundamentally a weakling. I inject this comment because I think it is of significance and importance, and because I believe many a boy is wholly misunderstood because this matter of

\* Read at a Special Session on Mental Hygiene of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.



energy equipment is not appreciated, and then, again, I have injected it because I believe that such a concept makes for greater tolerance as well as understanding of adolescent delinquencies; and helps the adult who has to deal with them to that frame of mind which sees the situation in its true light and enables him to guide the youth rather than use methods so frequently employed which are destructive.

All of this, you see, naturally leads to the inevitable conclusion that the adolescent's assets and liabilities are conditioned by what has happened to him in his bringing-up during the previous years. In other words, a successful adolescence is dependent upon adequate care and training in early childhood; and so at this point I wish to say a few things about the care and training and bringing-up of children which I conceive to be of fundamental importance in this whole question. The present century has been called the century of the child; but very often, I fear, with little appreciation of what a short distance we have come from the crudities and cruelties of the past, and of how much we are still involved in the same emotions that gave rise to them and in ignorance and indifference and selfishness toward the new generation. Many historical facts might be mentioned but I merely wish to call attention to what is common knowledge—that these cruelties of the past were largely practised on the theory that the parents owned the child and therefore he could be sold into slavery or be killed, as suited the parents' convenience.

As you know, China for hundreds of years was the country where infanticide was practised on a large scale; especially the female children being drowned. Edicts from time to time were published against this practice, and in the reign of Koang Sui, which began in 1875—only yesterday—these efforts were con-

tinued. But enough for the past. What is the condition at present? I have before me the figures of the National Child Labor Committee, which give a total of over 2 million children under 17 years of age employed throughout the United States in gainful occupations. Some of them are only 10 years old. It is economic pressure which has brought to the fore conditions which we never believed could have existed in this country, and at the same time has emphasized qualities in human beings which we thought, or perhaps only hoped, had been eradicated by civilization.

The high point for the child in the 20th century was President Hoover's White House Conference on Child Health and Protection. It will be noted in *The Children's Charter*, which was issued as a result of this Conference, that the child is entitled to full preparation for its birth. It goes on to state that his mother should receive prenatal, natal, and postnatal care, and that there should be such protective measures established as would make childbearing safer; but I think the first sentence, that the child is entitled to full preparation for its birth, means that the child should be wanted by the parents and that his birth should be arranged for on that basis. An enormous amount of the cruelty of the past was undoubtedly due to the birth of children who were not wanted. Particularly in China, the female child was a liability and was therefore killed, whereas in other places children became assets who could be put to labor, and made to help support the household. These conditions, of course, were most notable where the economic pressure was greatest.

If I were to sum up in a very few words all of the things which it is desirable that a child should have in order that he might emerge into a healthy adolescence, I would say that

he should have a feeling of security in a good home where he can be reasonably provided for, and that in addition to this, and perhaps still more important, the child should know without qualification that he is loved. These are the irreducible minima of healthy childhood; and yet if we will look about us only a little we will see how far we are from reaching such standards even in this so-called century of the child.

I will call your attention briefly to a few illustrations. In the first place, I think I can say without fear of contradiction that on the whole few children are provided for beforehand; that children come into the world more or less by chance and accident; that it is a rare thing for a parent to give as much care and thought to the planning for a child as he would to the planning for a garage, for example. I might go on to say, I think without fear of contradiction, that the child is also brought into the world for various ulterior motives. Not infrequently a wife decides to have a child thinking that thereby she will hold the loyalty and the affection of a husband whose interests are beginning to wander from the home. Whatever the result of such an experiment might or might not be, it is obviously not a fair procedure from the point of view of the welfare of the child.

Other such reasons may be cited, but I have before me a very interesting paper by Dr. Stevenson, of New York, a psychiatrist, by the way, who took the trouble to associate himself with a children's clinic, not in the capacity of a physician to the child but for the purpose of interviewing the mother and finding out why she brought the child to the clinic. It is exceedingly interesting to note that all sorts of reasons besides the health of the child were brought out. For example, one child was brought for the purpose of establishing a stronger case of neglect against the deserting husband by hav-

ing the physician say that the child was sick. In another case the child's aunt brought the child for examination in order to expose the neglect of its mother in caring for it by getting a diagnosis, the aunt hating the mother for taking away her brother's affection. In another instance the child was brought in order to prove its illness so as to avenge a dead sister by exposing her husband's neglect.

Such were the motives for which children were brought to consult the pediatrician; and I do not need to tell you that in all the work with children for the past quarter century we have almost invariably sought back of the child's illness in the home, and more specifically in the parents, for the cause of the trouble.

The child in the family is very much like a glass of milk in the ice chest, absorbing the flavor of all the personalities about him. Unfortunately, however, often this passive attitude does not sufficiently describe the situation, for the members of the household not infrequently use the child, as I have already indicated, as a means by which they can express their emotions, their animosities, their angers, etc.

You will see that I have wandered somewhat from my title but I wandered only in a direction which I intended to take. I have indicated that a healthy adolescence is dependent upon a healthy childhood, and then I have pointed out some of the defects in our modern attitude toward and understanding of childhood and children.

In setting forth the minimal requirements for healthy childhood I mentioned only 2—a good home and love. There is a third requirement which perhaps includes the other 2, and that is that the parents should be worthy objects of emulation for the child, that they should have personalities which the child can take over and idealize with the certainty that they will consti-

tute standards of conduct that will result in the building up of a healthy character and a good citizen. With all these requirements it is easy to see that we have the ideal setting for wholesome childhood, and this is the most certain assurance of a healthy adolescence. Of course, it is rather difficult to see how this last requirement can be brought to pass except as a result of many generations of development, but perhaps if only parents who wanted children had them a big step would be taken in this direction.

If the 20th century is properly called the century of the child, then it is only

because in this century the child has been discovered. We have not yet learned how to treat him, and, what is much more difficult, we have not learned that the parent needs the child as much as the child needs the parent. There is a mutual exchange in the parent-child relationship which is of the utmost importance, in my opinion, for civilization. It is only in the family relation, where sacrifices have to be made on account of children that those elements of altruism, sympathy, understanding, and tolerance are born which make the future of civilization worth struggling for.

## DISCUSSION

CLARENCE M. HINCKS, M.D.,

*General Director, National Committee for Mental Hygiene, New York, N. Y.*

THE previous speakers have provided us with a rich nourishing bill-of-fare on the mental hygiene of childhood. I would like to congratulate those who are responsible for arranging this program in securing 3 outstanding psychiatrists who have contributed to the development of the mental sciences and who command our respect because they have gained valuable insight into the human nature of children through day in and day out intimate clinical contacts.

All 3 speakers emphasized the point that, for each stage of a child's development, there should be adequate previous preparation. Dr. Wile informed us that happenings before the age of 2 influence the preschool age period of 2 to 5; Dr. Richards suggests preschool age experiences as potent factors in determining later child development; and Dr. White reiterates the same philosophy in speaking on adolescence. This

seems to me to be one of the cardinal principles in the whole domain of mental hygiene—that the effective safeguarding of mental health consists in laying the foundation at each stage of life for the sake, not only of satisfactory adjustment during that particular stage, but as preparation for the next age range. It is because of this principle, for example, that we as health workers are concerned with the so-called patterns of reaction at the preschool age level, knowing that there are involved determinants for the direction of future personality growth. Indeed this principle carries through from birth to death. We are, for example, determining in our 40's, in considerable measure, the degree of our mental health in our 50's, and so on.

Dr. Richards's hesitation to utilize the term mental health because of the dangers to our thinking in the tendency to separate the mental from the physical

or the mind from the body is in line with common sense. The sooner we include in our conception of health what we have previously dealt with in a sectional way under physical health and mental health the better. A unified approach does more justice to the facts and facilitates more effective application.

And now, may I hazard a few observations concerning the relationship between mental hygiene and public health, and developments that are perhaps worthy of our support. I will be brief because I realize that it is not the function of a discussant to present a paper of his own.

In the first place, I would say that, unless mental hygiene becomes thoroughly integrated into public health philosophy and practice, it will not achieve its main objectives, and I have come to the conclusion that we who are identified with the so-called mental hygiene movement have been slow, not perhaps in realizing this need, but in formulating our experience so that it can be readily used by the rank and file of public health workers. What is requisite in this regard? We must approach the subject of mental health in a positive way. We must set forth, as far as our experience enables us, the conditions for healthy mental development. This has been done to a considerable degree in regard to physical health. In this realm the public health worker recognizes the importance of such positive measures or factors as fresh air, sunshine, a balanced diet, vitamins, exercise, and so on. The time has come when we must organize

our mental hygiene knowledge so that we can lay down something approaching definite measures that public health workers can understand, promote, and apply in their daily work.

As far as adults are concerned we are now in a position to indicate at least a dozen factors that are of vital importance in the preservation of mental health, such as, for example, occupation, recreation, suitable outlets for creative imagination, social intercourse, the gratification of ego urges in healthy ways, and so on. My confrere, Dr. George K. Pratt, has just written a booklet which I hope will be widely read by health workers, setting forth positive measures that are applicable particularly to those who have become victims of unemployment.

It is in the realm of childhood that public health workers can be most effective. Now that mental hygiene is sponsoring studies in child development and is beginning to discover the factors that lead to mental health on the one hand and to departures on the other, there is prospect of rich material for public health. The papers here presented are illuminating in this regard.

Before concluding, I would like to thank leaders in public health for the help they are giving in fostering sound developments in our field. During the last few years this coöperation has been magnificent. These leaders appreciate the fact that public health must be interested not alone in longevity but in the quality of life as well, and it is in this direction that mental hygiene has a potentially significant contribution.

# The Aim and Accomplishments of a Health Center Mental Hygiene Program\*

ELIZABETH I. ADAMSON, M.D.

*Consultant in Psychiatry, Bellevue-Yorkville Health Demonstration,  
New York, N. Y.*

THE Bellevue-Yorkville Health Demonstration is financed by the Milbank Memorial Fund for the purpose of trying out approved methods for the prevention of disease and the promotion of health with more generous appropriations than are ordinarily at the command of public health authorities and private agencies. The district in which its activities are being carried on extends from 14th to 64th Streets on the east side of Manhattan, with Fourth Avenue as the western boundary below 42nd Street and Sixth Avenue above. The total population of the district is about 142,000. Dr. Shirley W. Wynne, Commissioner of Health of New York City, is Chairman of the Demonstration.

The nursing staff is composed of approximately 30 Health Department graduate nurses under the direction of the Bureau of Nursing of the New York City Department of Health, with which organization the Demonstration is not only coöperating and closely affiliated, but which also serves in the capacity of the official agency in the district.

The family case load of each nurse averages 300 while the individuals handled by each average 400. Besides dealing with the health problems of these families, the nurses are assigned

to the schools in the district and in this way are closely in touch with the school authorities and teachers of both the public and parochial school systems.

From April, 1929, to February, 1930, the Demonstration maintained a mental hygiene consultation service. This service was purely advisory; all problems needing intensive investigation and treatment were referred to mental hygiene clinics in the community. The staff consisted of one psychiatric social worker who functioned as part-time consultant.

In November, 1930, as an experimental undertaking, a complete mental hygiene unit was established as part of the Demonstration. This unit consists of a part-time psychiatrist, a part-time psychologist, and a full-time psychiatric social worker. The service is still largely for consultation, but now that more complete diagnostic facilities are available, treatment can be given to a few cases definitely needing psychiatric therapy. Assuming that this audience is especially interested in the educational aspects of the mental hygiene program, particularly as related to the nursing staff, we shall stress that aspect of the service rather than give the actual results of the clinic service, such as the number and type of patients treated, etc.

This is the first time that the City

\* Read at a Special Session on Mental Hygiene of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

Health Department has embodied as part of its services a psychiatric unit, and, as such, it is an important demonstration in public health work. Besides believing in the advisability of demonstrating the need for a psychiatric clinic in a city health center, the directors of the Demonstration felt that more knowledge on the part of the nurses regarding personalities and their deviations would be a most useful adjunct in handling the other health problems as well as decreasing the incidence of mental and behavior difficulties in the district by early diagnosis and treatment. The experiment was more of an educational nature than that of offering clinic service to individuals, based upon the desire to attack mental illness by prophylactic measures.

This audience is only too cognizant of the fact that lack of knowledge engenders fear, particularly in preventive medicine. We are all too familiar with cases of pulmonary tuberculosis being diagnosed as "lung fever" and treated as such. A tragically high mortality resulted because no therapy is effective for a nonexistent, in other words wrongly diagnosed, malady. This make-believe disease was begot of primitive fear due to ignorance. For example, 10 years ago a confrère told me that he did not report his cases of active tuberculosis because he had to make a living, implying that the patients would seek another physician if he reported the illness. Gradually, through education, the morbidity and mortality rates of tuberculosis are decreasing steadily. Through education, the taboos have been removed from many abnormalities, and even with venereal disease marked strides are being made in the willingness on the individual's part to admit of an accurate diagnosis.

With mental illness, however, we are woefully lagging in this regard. One reason for this is that mental disease connotes to the layman legal in-

sanity. Naturally, no legally sane person wants to be considered insane; hence he avoids any admission of a term that smacks of insanity. Another impediment in the way along the road to a clearer understanding of mental disease is the social stigma attached to any form of so-called misbehavior. We are urged in our youth to approach perfection in some way and any inability along this line is viewed as antisocial, amoral or unethical. No one enjoys being labelled under any of these terms. There are numerous other causes why mental disease is a type that people fear most. Due to ignorance it is the pariah of medical pathology.

We, therefore, realized that an enlightenment of our population would most effectively be achieved by giving the nurses who served the people a clear understanding of mental hygiene principles. If the individuals in the community were to be reached the nurses would be among the ones to do it. Public health nurses are in a peculiarly intimate contact with their patients and because of this unique relationship can exert an immeasurable influence.

In my opinion, our nursing group of Bellevue-Yorkville, in their educational status and work efficiency, measure up to any similar group, yet they feel the need for more knowledge about the handling of personalities. Partly because of their making known this need, the directors were led to take the establishment of a clinic under advisement. The nurses have since realized more than ever that a mother's lack of coöperation in the administration of toxoid or in carrying out the doctor's recommendation concerning the baby's diet may be a mental hygiene problem. To give the nurses enough knowledge so that they could deal with personality deviations and through them to permeate the community with greater mental health was our main objective.

The question of method then presented itself. How were we to teach a group enough psychiatry so that they could recognize mental problems and be able to carry out certain types of treatment with the help of the mental hygiene staff? The methods chosen to achieve our aim were group discussions, not formal didactic lectures, individual conferences on cases referred to the clinic and personal interviews if they were desired. The individual conferences gave us a clearer view as to the efficiency and personality of each nurse, which in turn, was of great benefit in leading the group meetings. These latter were held twice a month, the first hour in the morning. The nurses were expected to attend the conferences and were excused from their other work for the hour unless a clinic was in session, in which case some few had to be on duty. Occasionally, for other personal reasons, a few nurses were excused from attending. Because of the desire to avoid rigidity and formality, the students were free to interrupt by discussion or questions. In this sense we cannot designate the conference as a lecture.

In all teaching there are certain essentials that the instructor must possess. The primary ones are a knowledge of the subject coupled with the sincere conviction in the soundness of this knowledge; a non-defensive and non-patronizing attitude to those whom he is to teach and above all an understanding and knowledge of the students at least collectively, preferably individually also. We shall not dwell upon the first of these; that can be readily determined by one's previous training and professional rating.

Regarding the attitude to the student body, what had to be coped with at the first meeting was the age-old defense of nurse to doctor. Even though it were in the scope of this paper we could not solve the problems of why the nurse

resents and yet is fearful of the supposed superiority of the person with an M.D. degree. At first they asked no questions and offered no ideas. They were dutiful, courteous, but silent listeners. They gave us the feeling that we were trying to impress them with profound and erudite ideas. Gradually, by individual conferences on cases that had attended clinic and whom the nurse was handling in the school or in the home, a rapport was established that made our bringing them into the group discussion more possible. We have tried to be neither unconvincing nor coercive, and above all desired to prevent an emotional deafness to mental hygiene; thereby symbolizing a faulty relationship between teacher and pupil. All of us are too reminiscent, unfortunately, of the teachers in our lives who have checked our enthusiasm in a subject solely by their personal contact with us. In that way, many an intelligence rating has been lowered by our emotions. It is the responsibility of the teacher to prevent such a happening, as his function is to develop, not inhibit potentialities.

Closely allied or coupled with the importance of teacher-student attitude is the too frequently disregarded necessity of the teacher finding out how much the student already knows about the subject to be taught and how much the student at the time is capable of grasping, both intellectually and emotionally. We found out that, as is the usual condition, these graduate nurses had had no adequate course in psychiatry during their training. Some had attended lectures and read since graduation but few had any appreciation of the meaning of psychiatry and mental disease. We therefore had to begin at rock bottom, which has the advantage of eliminating any prejudice or faulty knowledge of the subject. Having determined how little they knew about mental hygiene, the next task was

gradually to ascertain how much they then could learn.

The extension of knowledge or learning is dependent upon cerebral cortical endowment and the desire to learn. The cortical equipment of the group was more than adequate for a sound evaluation of mental hygiene. They were of normal intelligence capacity, otherwise they could not have arrived at and accomplished in the nursing field what their positions demanded. Our job was first to attract their attention and arouse their interest to such a degree that they desired and felt the need of more information about human reactions, and, secondly, to satisfy this need. May we say that in the beginning ultra-technical words were omitted based upon the fact that only through verbalization can an idea become conscious and thereby understandable. If wholly unfamiliar words had been used the extension of the field of psychiatric knowledge would have come to nought. Gradually, as the ideas were assimilated and digested, then the technical words became associated with and attached to the ideas.

The following topical outline indicates the approach we made. After we distinguished between neurology, psychiatry, mental hygiene, and psychoanalysis, they then knew in what realm the discussions were to be. Following this, we took up the basic principle of the organism-as-a-whole or the totality of the living being, whether plant or animal, and considered the life reaction, for example, of the ameba, the fish, the tiger, and man. We viewed the psyche as the manner by which each organism conducts itself in its particular life setting and dwelt upon the fact that mentality is not an organ or system that has been added to or superimposed upon other organs or systems at some era in the process of development. We therefore eliminated the unsound conception that is so prevalent, of heredity versus

environment and mind as separated from body.

Even though the final word regarding instincts has not been said, we, nevertheless, tried to show that the instinctual basis of behavior is common to all mankind and that the degree, intensity, or quantity of response determines health or ill health and that this determination has a discoverable causation traceable to the relationship of parents to each individual child, who in turn has a certain biological equipment. In taking up the psycho-sexual development of a child, the family setting was again gone into more fully. It was our hope that the term "sex" would be enlarged in their opinion and not be thought of as a curse or blessing from mother nature, in this way to view masturbation, homosexuality and perversions as stunted emotional development rather than moral degeneracy. The term "sexual satisfactions" was divorced from the limited sphere of prostitution and immorality.

To one discussion we gave the title of "The Contagion of Mental Disease" and by explaining the mechanism of identification somewhat clarified the old adage of "Like father, like son." In this way habit formation and response to stimuli were made synonymous with the dynamics or the manner by which the specific organism operates. Other mechanisms were, of course, explained and an attempt was made to illustrate how recognizable they are in types of both normal and abnormal personalities. For example, when a patient formerly might be described as uncooperative or untruthful, terms alas, which too frequently appear on the case records of every organization, an attempt was made to understand what he was trying to do and what emotional gratification he was seeking.

Because of the important rôle of the unconscious in one's mental life, the structure of the psyche and its develop-



ment were discussed in relation to reactions that are not regarded as abnormal. In this way the gap between the normal and the pathological mind was bridged and a correlation between mental hygiene and such social problems as alcoholism, unemployment, or communism, seemed pertinent. Often, the nurses would request a discussion of such problems—to illustrate a specific case. The morning after "Two-Gun" Crowley was electrocuted because of his having murdered a New York policeman, the hour was devoted to looking at the antisocial and criminal man through the lens of a psychiatric microscope. Endowed with only a limited intelligence, the son of an ignorant peasant girl and policeman, born out of wedlock, boarded at baby farms, with no family life in early years, with no one who cared for him but a foster-mother with whom he lived in later childhood, and with a fixed paranoid trend toward policemen and social authority—all of these facts made his crime more understandable to the group.

At various meetings other specific cases were analyzed in the light of causation in order that the students might appreciate that to understand the motivation of surface behavior is just as necessary for therapy as to determine whether or not a fever is caused by a typhoid or tubercle bacillus.

It may seem irrelevant to mention a problem that too often presents itself in the present-day teaching of mental hygiene and psychiatric principles. It is one which we have tried to eliminate because we believe it must be eradicated before mental hygiene can come to its just fruition. We refer to the cleavage existing between the medically and non-medically trained personnel. Several years of personal experience have brought us in touch with both groups and there has not yet been great progress made in healing the breach due

to their previous training. The medical schools and hospitals, the only places where physicians and nurses can get their training, have stressed organs, systems and body; therefore, the human being is understood only through anatomy, physiology, and pathology. On the other hand, social workers and educators are also alive to the mental hygiene movement, partly because they are meeting a need that was not met by the medically trained person, either physician or nurse. In turn, they are educated in our general colleges and schools of social work where the emphasis of man has been placed on that subtle thing called "mind" and only through academic psychology, philosophy, economics and sociology, has he been explained. Unless the two groups can come together, mental disease will not be understood and prophylactic measures in our homes and schools will be wanting. We do not propose that educators and social workers must study medicine, neither do we feel that a capable nurse must be also a doctor of philosophy, but if any of us, in whatever sphere, are to play our part in helping individuals deal with themselves in life's setting, we cannot consider human reactions as a psychological phenomenon coming from out the "blue," nor as the result of chemical imbalance, but rather regard behavior as the motor response from external and internal stimuli to the entire organism and not from thought processes alone.

This, we trust, has been our approach in teaching these nurses. We have omitted discussions regarding various schools of psychopathology, and we have not given them the symptomatology of the different clinical entities met with in psychiatry. We have adhered to no set curriculum except that determined by their desire to learn more.

Mental illness is a social problem; so

are tuberculosis and diphtheria; but all must be thought of in the words of Francis W. Peabody when he said, "What is spoken of as a clinical picture is not just a photograph of a man sick in bed, it is an impressionistic painting of the patient surrounded by his home, his work, his relations, his friends, his joys, sorrows, hopes and fears." A knowledge of mental hygiene gives to these words a real meaning.

In order to evaluate our results we asked the nurses recently to express in a few words whether or not the mental hygiene service had been of value to them in any way. They were told that the opinions could be signed or unsigned, as they wished. Twenty-six replies came in—of these, 1 wrote "No"; another response was "I attended very few of the lectures so cannot give a fair opinion. The few I attended I did not enjoy as I always feel that Dr. Adamson is too positive in her assertions and creates a definite negative reaction in me." The other 24 replies were positive that the service had been of definite value by obtaining better results in the following ways, as expressed in their words:

In practical work in the field; approach to families; solving reasons for refusals and combating refusals; understanding the human side of life; better contact and more tact; realization that our failures are in many instances due to faulty approach; adjustment to my own family problems, also staff; understanding more problems with which we are confronted in our families; effort to take away one thought from each discussion; development of greater tolerance and understanding of people; recognizing and handling situations met in the homes and school, particularly in dealing with children and teachers, so that now the pupils, teachers, and nurses have more understanding of each other; improvement in group adjustment; applying these methods to everyday work have found them very effective; being more able to account for attitudes of many contacts; helping me to see why coöperation could not be obtained due to mentality of the individual.

Based upon these opinions and those of other staff members, we can now say with conviction that a mental hygiene service is a desirable component of a health center, particularly in the educational value to the nurses.

Our project is now completing the second year and we believe a continuation of it is more than justified if we expect nurses to render a real service in the field of public health.

---

## Unemployment

THE Save the Children International Union with headquarters at Geneva recently decided to make a study of the effects of unemployment on children and adolescents. It is expected that this study will be of practical value in showing among other things the need for more extensive child welfare work and the mistake of curtailing it for reasons of economy. The study will also allow a comparison of the effectiveness of the

measures taken in the different countries.

At first a detailed study in a number of countries was planned, but later it was decided to limit the study to Belgium, Germany, Great Britain, Hungary, Switzerland, and the United States, and to publish the report in the near future.—*Nouvelles de l'Union Internationale de Secours aux Enfants*, Geneva, Oct., 1932.

# Effects of Air Contaminants on the Natural Light of Cities\*

H. B. MELLER AND MARY E. WARGA

*Air Pollution Investigation, Mellon Institute, Pittsburgh, Pa.*

SINCE 1911, Mellon Institute of Industrial Research has been interested in the problem of air pollution, particularly in industrial communities, and has in progress a program of investigation of the causes and effects of air contaminants, especially those resulting from the combustion of fuel.

Of major importance in a study of the effects of air pollution is the determination of its action in obstructing natural ultra-violet radiation, particularly in the shorter wave lengths. The primary purpose of the present paper is to give some data obtained from 12 months' continuous records of ultra-violet radiation in the region below 3,350 Å. Seasonal and certain monthly, daily, and hourly variations are shown; reception on clear days is contrasted with that on partly cloudy days, on cloudy days, and on days when there was a blanket of light smoke. The paper should be considered one of a series, the first of which has been presented elsewhere.<sup>1</sup>

Data are taken on the roof of the City-County Building in Pittsburgh, which is 9 stories high, with the flat roof 163 ft. above the street—933 ft. above sea-level.

The apparatus employed has been described at length in the paper cited. In consequence, the description given in the present contribution will be condensed, and sufficient only to make the findings understandable.

## INSTRUMENTS

*Receiver*—We have been and are using a Rentschler Ultra-violet Meter designed primarily as a dosage meter to determine the amount of ultra-violet necessary to produce erythema. At the inception of the study, necessary modifications were made in insulation, housing, capacity, etc., to adapt the instrument for continuous use outdoors.

The essential feature of this meter is the photo-electric cell with Corex D bulb; the uranium plate cathode of the cell has an area of approximately 12 sq. cm. Current flows only when ultra-violet radiation between the approximate limits of 2,700 Å and 3,350 Å falls on the cell.

The amount of current is proportional to the intensity of the ultra-violet, although this current is very small—approximately 0.1 micro-ampere for fairly intense radiations. It is necessary to amplify this small current and hence, actuated by a 180-volt battery of dry cells within the cabinet, a glow relay or starting anode tube is placed in the circuit. Connected to the ultra-violet cell is a condenser, which is slowly charged by the current trickling through the cell. Thus the time of charging the condenser to a fixed quantity is proportional to the intensity of radiation. When this fixed quantity of charge is reached, the condenser spills over and the tube "breaks down" and an impulse of current flows, operating either a click recorder or a graphic recording meter.

This photo-electric cell, properly

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

used, has a constant sensitivity within the range of measurable accuracy and, according to Rentschler, shows no change or aging over a considerable period of use. Different cells, however, have different sensitivities and each must be separately calibrated against a quality of source closely similar to the one to be measured. Particular attention must be given to insulation of connecting leads, to prevent leakage to ground or around the condenser.

It may be noted that the instrument actually integrates or records intensities and amounts (or time-intensities) of ultra-violet radiation, but at present, for lack of the proper terminology, there can be no absolute units of value assigned to the data. In these studies the designation "Rentschler Ultra-violet Unit" is used (a unit being, arbitrarily, one click from the meter), in terms of which the readings are given. The responses were not uniform through the year, because neither the same box nor the same cell was used throughout, and because condenser capacities were changed from time to time to increase or decrease the amount of ultra-violet necessary to break down the glow relay tube. The meters were therefore checked as described below, and the record of responses brought to a uniform standard, which was fixed at 29 clicks per minute.

Checks are made frequently (normally once a week) against a Mazda Type S-1 lamp. This lamp is very susceptible to temperature changes and to position of burning. The method of checking used here is to burn the lamp in a vertical position for 30 minutes, then to take the response of the meter at a definite distance (24") during the next 15 minutes. If more time is needed, the lamp is allowed to cool and the process is repeated.

*Solar Table*—With the present construction of the Rentschler meter, the cell is fixed in a position perpendicular

to the base of the box. Therefore, in order that direct sunlight shall fall normally on the cathode, the box must be at an appropriate angle and must rotate in a plane parallel to that of the sun's apparent path. To provide for this position, the solar table was devised. It consists of a table set on a north and south axis and carrying a circular disc, set at an angle of  $40^{\circ}$ ,  $30'$ , corresponding to the latitude of Pittsburgh. To this is attached a cradle—for the meter—with an adjustment for declination. The table is connected, through gears and shafting, to a  $1/6$  H.P. synchronous motor, which has a speed of 1,800 r.p.m., the table making one revolution per day. Thus the cathode of the photo-cell is kept normal to the sun.

The meter is covered with a bakelite box, with a 5" sphere of Corex glass, frosted inside, over the cell. Similar Corex bulbs were tested by the Westinghouse Lamp Company to make certain that no appreciable solarization could occur.

While the cathode of the photo-cell is normal to the sun, it receives radiation from an appreciable angle. In addition, the frosted Corex bulb is integrating and adds to the amount of sky-shine received. Hence the total amount of ultra-violet radiation which reaches the cell is the direct plus a considerable percentage, but not all, of the diffuse or reflected radiation.

*Recorder*—The impulses from the meter are transmitted to a Westinghouse watt-hour demand meter, type RA; the pen is set to trip at 5-minute intervals.

Results from the records are chiefly comparative, and it should be remembered that very little solar radiation reached the cell that was of wave length shorter than 3,000A, hence not of maximum effectiveness in producing erythema. To correlate graphs with erythema, it may be helpful to note that

the maximum biologically active ultra-violet values at midday represent a minimum perceptible erythema in about 20 to 30 minutes.

#### EXPERIMENTAL FINDINGS

Figure I is a comparison of a clear day in June with a clear day in December. The values indicated are the recorder readings at 5-minute intervals throughout the day. Note the effect of light clouds during the middle of the day in June.

Wherever possible, checks were made to determine the accuracy of methods used. In this case, for example, the altitude of the sun at noon on the day in December was found to be practically the same as the altitude of the sun at that time on the day in June when an equivalent amount of radiation was received. This indicates accuracy of method and linearity of response of the meter.

Figure II indicates, for each month from July, 1931, to June, 1932, the average time of sunrise and sunset and

the average time of beginning and ending of ultra-violet radiation below 3,350A. Considering as maximum the highest value in ultra-violet, as received at midday on a clear day in June, the chart indicates the average beginning and ending time for 75 per cent, 50 per cent, 25 per cent, and less than 25 per cent, respectively, of this maximum. The reason for making such divisions is that only a part of the ultra-violet received is in the "therapeutic band," which is between 2,950A and 3,150A. Those desiring to estimate when this band may be expected to be present may do so from the chart, keeping in mind the limitations within each division. The spectrographic study to determine shortest wave lengths at different times during the year is not completed, and hence cannot be included in this paper.

The time given on this and other charts referred to in this paper is local apparent time.

In Table I are given averages of daily totals, averages for days when there was

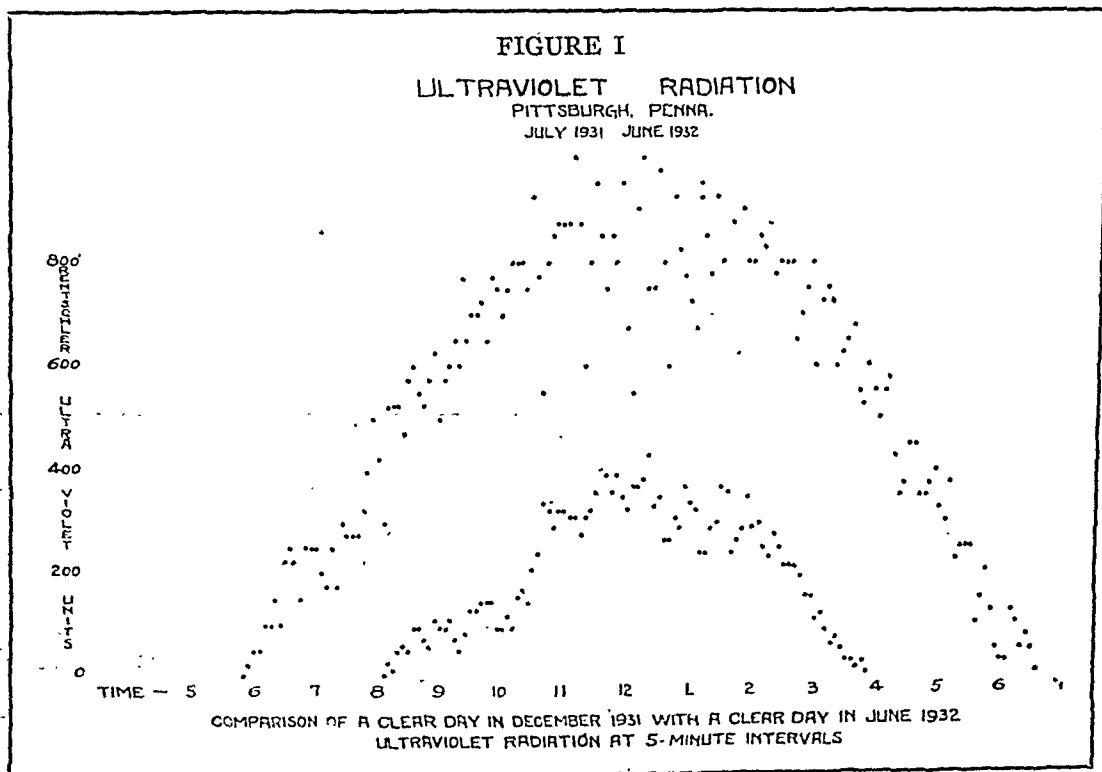


TABLE I  
AVERAGE OF DAILY TOTALS

Month	Clear Days						Partly Cloudy Days					
	Light Smoke Blanket				Days Avg.	Light Smoke Blanket				Days Avg.		
	Days With- out	Days With				Days With- out	Days With					
1931												
July	5	70,465	0		5	70,465	12	63,155	0		12	63,155
Aug.	2	69,880	0		2	69,880	11	60,120	2	48,760	13	58,375
Sept.	2	50,225	2	35,745	4	43,000	13	46,665	0		13	46,645
Oct.	3	40,915	4	27,270	7	33,245	6	43,260	4	28,120	10	37,205
Nov.	2	31,025	2	23,790	4	27,410	6	25,780	3	21,990	9	24,520
Dec.	2	23,980	1	18,920	3	22,230	4	14,630	0		4	14,630
1932												
Jan.	1	27,245	1	20,070	2	23,660	5	33,270	1	18,905	6	30,395
Feb.	2	45,660	2	17,775	4	31,720	6	25,800	3	19,940	9	23,850
Mar.	0		0		0		5	56,750	0		5	56,750
Apr.	4	73,730	0		4	73,730	9	63,080	0		9	63,080
May	6	85,730	0		6	85,730	8	64,235	1	41,115	9	61,665
June	2	76,000	0		2	76,000	7	67,895	1	51,750	8	65,630

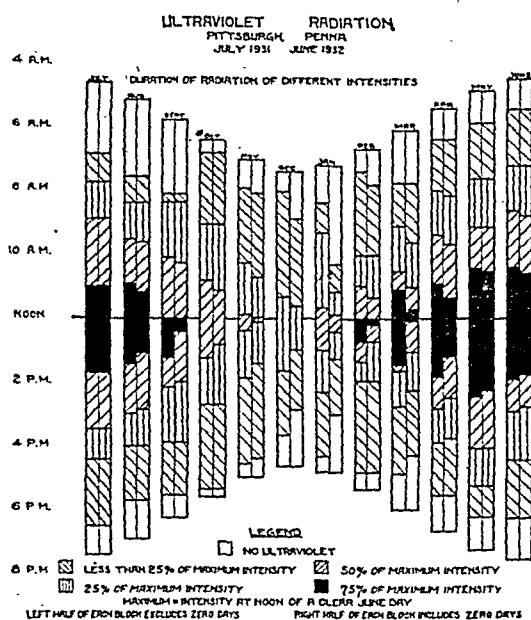
Month	Cloudy Days						Daily Averages			
	Light Smoke Blanket				Days Average	Excluding Zero Days		Including Zero Days		
	Days Without	Days	With			Days Average	Days Average			
1931										
July	5	52,035	0		5	52,035	22	62,490	22	62,490
Aug.	6	30,075	0		6	30,075	21	51,380	21	51,380
Sept.	3	36,270	0		3	36,270	20	44,360	20	44,360
Oct.	7	25,450	4	22,890	11	24,520	28	31,230	28	31,230
Nov.	9	13,550	5	8,520	14	11,755	26	19,030	27	18,327
Dec.	3	9,300	13*	5,315	16	6,065	17	13,075	23	9,660
1932										
Jan.	2	14,510	12	3,820	14	5,350	13	18,940	22	11,195
Feb.	2	24,300	10	15,585	12	17,035	25	21,835	25	21,835
Mar.	9	28,280	8	12,150	17	20,690	19	33,445	22	28,885
Apr.	7	59,180	6	23,290	13	31,870	26	49,075	26	49,075
May	5	49,490	0		5	49,490	20	65,840	20	65,840
June	5	60,225	3	31,050	8	45,640	18	59,340	18	59,340

\* Includes 3 days of rain.

a light smoke blanket all day, and for days when there was no such blanket. The number of days used in making up these averages was 75 per cent of the total number of days in the year. Those omitted included days on which the meter was taken inside for checking, the records for such days being incomplete; days on which the meter was not

operating by reason of temporary failure of a relay (which occurred several times, owing to the variable strain on the spring of the relay caused by the great variation in angle as the box revolved with the solar table); failure of glow tube (which happened twice); loosening of cement between base and cover of photo-cell; and days when the

FIGURE II



morning record indicated the possibility of leakage caused by moisture. The averages are incomplete to this extent, but the trends are correct, and it is believed that the averages are approximately so.

The effect of smoke and of "zero" days—when no ultra-violet at all was received—will be considered later.

In segregating the clear, partly cloudy, and cloudy days, the system used by the U. S. Weather Bureau has been followed: 1.0 = completely overcast; 0.1 to 0.3 = clear; 0.4 to 0.7 = partly cloudy; 0.8 to 1.0 = cloudy. It is obvious that, while this scale gives the sky condition as to extent of cloudiness, it does not include, in the latter two groups, the extent of direct sunshine. The classification is used as mentioned, however, for this general analysis; for a more detailed study for later presentation, a combination of the percentage of cloudiness and the extent of direct sunlight will be followed. Days of light smoke are those on which the visibility was at no time greater than 8 miles, as a result of smoke and dust as distinguished from other obstructions to vision. On many other days there

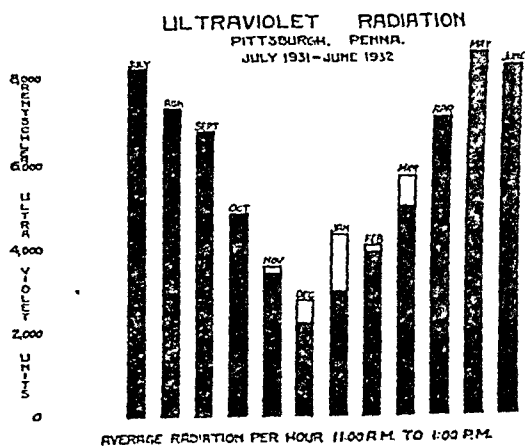
was smoke during the earlier morning hours and the later afternoon hours, but such days are not included as days of light smoke in this paper.

In order to indicate the trend through the seasons, Figure III is shown for the two hours from 11 a.m. to 1 p.m. (1 hour on each side of noon), for clear periods only. The averages are in Rentschler ultra-violet units per hour. Attention is again called to the fact that the responses from different meters will not be the same; while, with another meter, trends would be comparable, for direct comparison of amounts the records would need to be adjusted to the same number of clicks per minute (29) under the same standard conditions as mentioned previously. In addition, the effect of "zero" days is indicated, the solid part of the column being the average for all days, while the height of the open portion indicates the average for the month excluding "zero" days.

The hourly averages 11 a.m. to 1 p.m., for clear days only, are again shown in Figure IV. It will be noted that, with one exception, the periods when there was a blanket of light smoke occurred during the heating season.

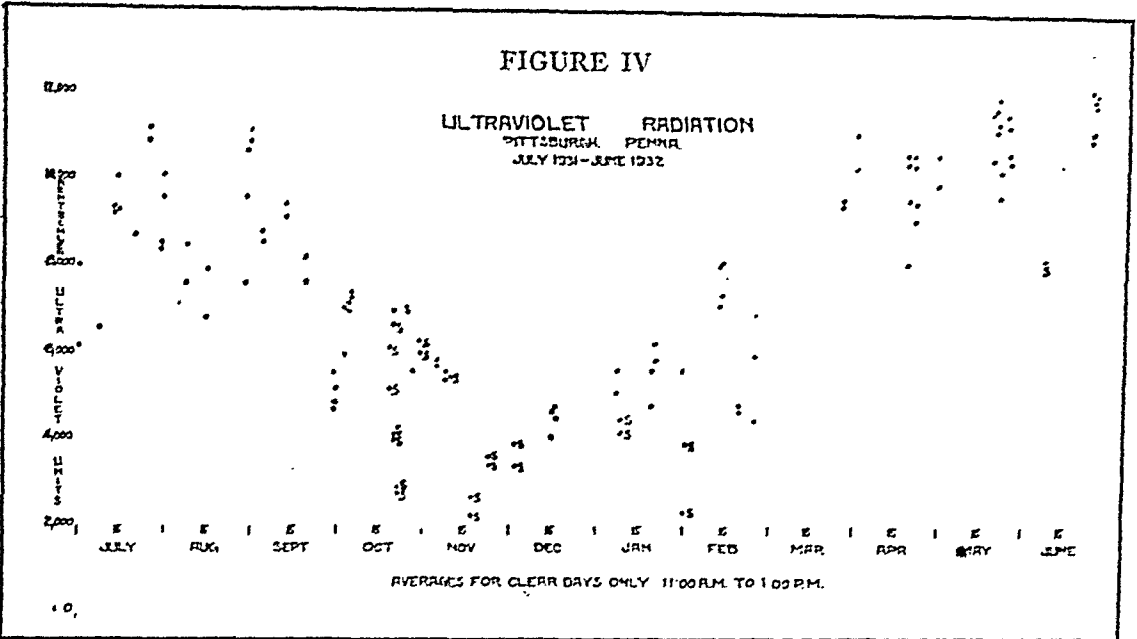
Figure V is an attempt to show, graphically, not only a comparison between clear periods (11 a.m. to 1 p.m.),

FIGURE III



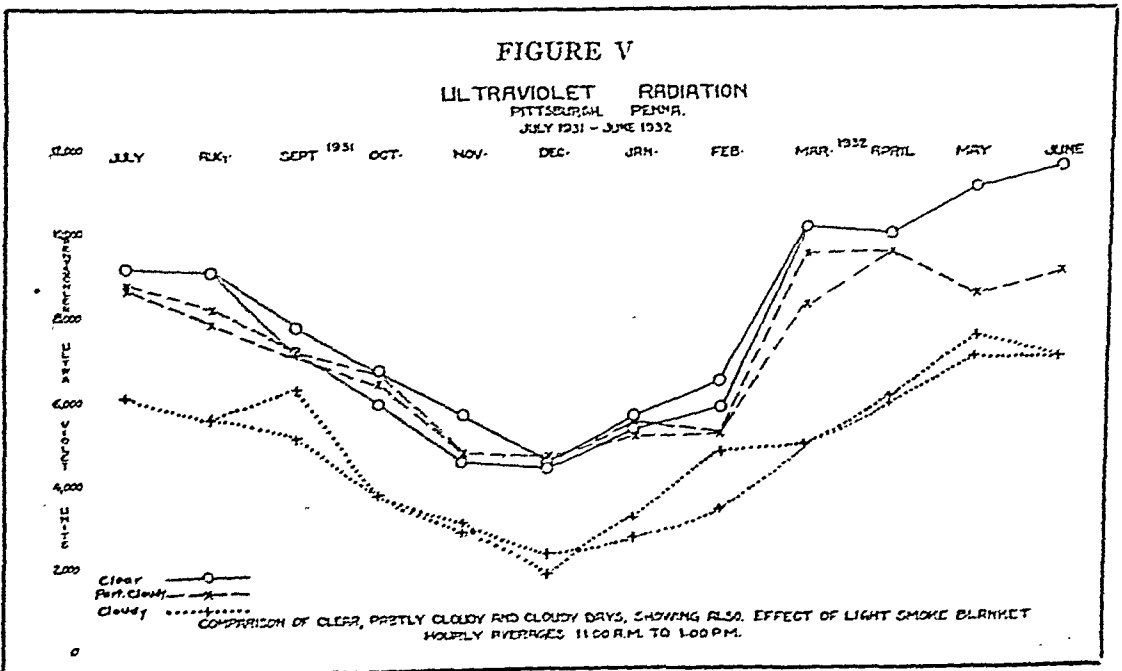
partly cloudy periods, and cloudy periods, but also in each group the difference between days designated as

analysis, which will be made subsequently.  
At the Pittsburgh station of the U. S.

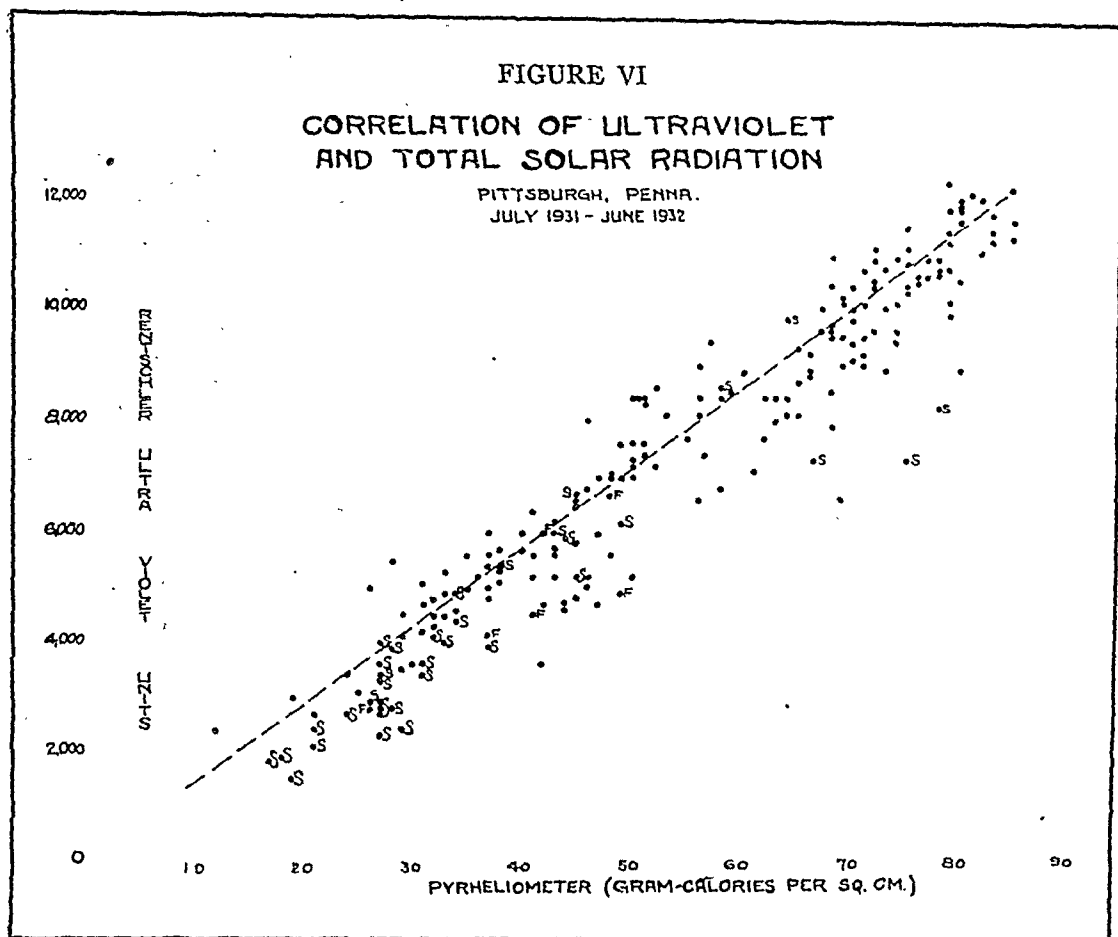


having light smoke and days not so designated. This latter comparison is not so trustworthy for partly cloudy and cloudy days as it is for clear days, because of the variable intensities within these groups, owing not only to differences in extent of cloudiness, but also to the type of clouds. The chart points to the desirability of a closer

Weather Bureau is a pyrliometer, which records the intensity of total solar radiation (infra-red, visible and some ultra-violet). Figure VI is a correlation of total solar radiation with ultra-violet below 3,350A, as recorded by the Rentschler ultra-violet meter on the roof of the City-County Building, both taken for clear hours only between







10 a.m. and 2 p.m. The ordinates on the chart are Rentschler ultra-violet units, the abscissae are from the pyrheliometer, in gram-calories per sq. cm.

#### DISCUSSION OF RESULTS

It should be kept in mind that the uranium photo-cells used in the Rentschler-ultra-violet meters from which the accompanying data were taken are not sensitive above 3,350Å; the radiation reported is between that wave length and the lower limit of sunshine.

The time during which such radiation was received on clear days varied between 5:30 a.m. to 6:35 p.m. (12¾ hours) for June, and 8:05 a.m. to 3.50 p.m. (7¾ hours) for December.

Only a part of this radiation is in the therapeutic band, so for purpose of comparison the time chart (Figure II) was prepared to show duration of

various percentages of the maximum—maximum being the amount of radiation received at midday on a clear day in June. On this basis, and considering the time between sunrise and sunset for each month as 100 per cent of possible time, it will be noted that the total time between the first and the last response of the cell was about 80 per cent of the total number of sunshine hours throughout the year, with variations from about 75 to about 85 per cent.

Radiation equal to or greater than 25 per cent of the maximum intensity extended over an average of 45 per cent of the number of sunshine hours, with variations between 66 per cent in June and 14 per cent in December; for 50 per cent of maximum, the percentage was 24, with variations from 48 per cent in May to zero in December; and for 75 per cent of maximum, 8 per cent average varying from 25 in May to 1 in February

and zero in October, November, December and January.

The maximum radiation received in a 5-minute period on the clear day in June, shown in Figure I, was 1,000 Rentschler units, while in a 5-minute period on the clear day in December it was 430 units.

Comparisons between clear, partly cloudy and cloudy days, with and without smoke, are limited in this discussion by the broadness of the classifications used, which are standard of the U. S. Weather Bureau. Using their definitions, ratios between high and low months, for totals of daily averages of ultra-violet radiation below 3,350A, comparing June and December, for example, were: for clear days, 3.5 to 1; for partly cloudy days, 4.5 to 1; for cloudy days, 8.5 to 1; and for all days, 6.0 to 1.

The effect of a blanket of light smoke, in obstructing ultra-violet radiation, has been indicated in Figure IV. There were 70 days of light smoke (according to the classification mentioned) in the 6 months October to March, and 15 days in the 6 months April to September. During the 6 months October to March, 50 per cent of the clear days, 26 per cent of the partly cloudy days, and 62 per cent of the cloudy days, or 49 per cent of the total were days of light smoke. On the

other hand, during the remaining 6 months of the year, 9 per cent of the clear days, 6 per cent of the partly cloudy days, and 22½ per cent of the cloudy days, or 12 per cent of the total were days of light smoke.

It was mentioned that 75 per cent of the total number of days in the year was used in the tabulations and charts presented. If all days are included, 41 per cent of the period October to March, and 8 per cent of the period April to September were days of light smoke. The proportion is about 5 to 1, whether all or 75 per cent of the number of days in the year is used.

As brought out previously, this paper is really a progress report—a brief general analysis of a part of the data taken during the period. Closer analyses, to be made of these and other data on hand, will be made the subject of other papers in the series. Then, too, further studies will be made, including a comparison of the uranium cell with a titanium cell recently developed by Rentschler.<sup>2</sup>

#### REFERENCES

1. Meller, H. B., Hibben, S. G., and Wurga, Mary E. Studies of Ultra-violet in Daylight. Presented before the Silver Anniversary Convention of the Illuminating Engineering Society, Pittsburgh, Pa., October 15, 1931.
2. Marden, G. W., and Smith, K. O. A Use for the Titanium Photo-Electric Cell. Presented at the general meeting of the Electro-Chemical Society, Cleveland, September 22-24, 1932.

## Young Unemployed

ACCORDING to a recent ruling by the Federal Government, the maximum age for admission to the continuation courses for unemployed has been raised from 23 to 25 years. In these courses practical work is supposed to occupy about four-fifths of the time. Emphasis is placed on close coöperation among all the public and private agencies interested in unemployed young people for the purpose of obtain-

ing the necessary food and working clothes for those attending the vocational continuation courses. The ruling specified measures for unemployed who have been previously engaged in some work and for those who have just left school.

An appropriation for this work has been made by the Federal Government. —*Deutsche Ztschr. f. Wohlfahrtspflege*, Berlin, 9, 1932.

# Antirachitic Activation of Milk by Direct Irradiation With Ultra-violet Rays\*

G. C. SUPPLEE, PH.D., F.A.P.H.A.

*Director, The Dry Milk Company Research Laboratories, Bainbridge, N. Y.*

DURING the past few years practical methods have been developed for the economical production of irradiated milk. Clinical and laboratory experiences have proved the value of such milk for the prevention and cure of infantile rickets. These facts may very properly serve as a basis for discussing direct irradiation of milk from the public health as well as the technical point of view. Before discussing the irradiation of milk as a matter of commercial practice, it is desirable to examine the basic conditions upon which such a development may be predicated. An extension of the practice must, of necessity, take into account the existence and solution of practical problems, both dietary and industrial.

The prevalence of rickets among children less than 2 years of age is acknowledged.<sup>1</sup> Such data indicate that it is the most common nutritional disease of childhood. Its geographical distribution is almost universal, varying in intensity with seasonal and climatic conditions, and influenced by density of population. Surveys conducted during recent years indicate that from 50 to 96 per cent of the younger children in the larger cities of the United States suffer to some degree from rickets. This condition challenges the attention

of those concerned with the maintenance of the public health, not only from the standpoint of infant welfare, but also from that of conservation of adult life and national efficiency. The following statement from a British source<sup>2</sup> is pertinent:

The disease has been long prevalent in this country, and though relatively non-fatal, it is one of the most fertile of the crippling and disabling diseases of childhood. . . . Rickets is a serious factor in national inefficiency, for it often leads to structural malformation of bones and teeth, to a lower power of resistance, and to the occurrence of respiratory complications. Holt observes that the encroachment upon the lungs by a thoracic deformity may in itself be enough to keep a child in delicate condition and retard its growth; such a condition is a constant invitation to acute attacks of bronchitis and pneumonia.

Huldschinsky's<sup>3</sup> discovery of the curative effect of the rays from the quartz mercury vapor lamp when applied to rachitic infants was soon followed by those of Hess<sup>4</sup> and of Steenbock<sup>5</sup> that certain foods could be endowed with antirachitic properties—that what we now know as vitamin D is synthesized in inert material by a mere exposure to suitable radiant energy. The basic character of these discoveries placed at our disposal the fundamental knowledge necessary for the creation of new agencies for the suppression and elimination of infantile rickets. This disease is with few exceptions prevented by a proper dietary

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

containing an adequate quantity of vitamin D.

The early reports emanating from American and European sources indicated the efficacy of irradiated fluid or dried milk for the prevention and cure of rickets in infants as well as in experimental animals. These stressed the favorable clinical and biological manifestations, but gave little or no constructive data in regard to the character and amount of activating energy applied to the milk during irradiation. Exposure periods varying from a few seconds to 2 hours were used. Obviously such wide differences in technic were bound to cause variable properties in the irradiated product, and to foster skepticism as to the merits and practicability of direct irradiation of milk, as holding promise of anything further than an interesting laboratory demonstration. Much was left to be done before the value of the basic discoveries could be applied in industrial practice with reasonable assurance of even mediocre success. However, these early demonstrations served a most useful purpose in calling attention to possible developments of major importance, and to the necessity of a standardized method as a prerequisite to extended adoption for use in the treatment of the general milk supply.

Since milk is the sole or major article of diet of every child during the age of greatest susceptibility to rickets, the desirability of having available a milk with a self-contained adequacy of vitamin D for the prevention or cure of rickets is at once obvious. Such a product would provide a new type of prophylaxis, simple in application, economical, and entirely free from the inherent handicaps involved in the use of the better known specifics. However, such an achievement presupposes the correlation and control of basic factors concerned in the irradiation technic. Responsibilities of no small moment are

also involved in the general distribution of such a milk; particularly when it is relied upon as the sole protective agent. Notwithstanding the lack of uniform methods and of definite knowledge regarding the control of energy applied in the early experiments, practically all the clinical results were remarkably free from evidence of secondary or toxic effects resulting from the use of irradiated milk.

The industrial application of methods for the direct irradiation of milk must take into account numerous inter-related factors. Facilities must be provided for the exposure of large volumes of milk to suitable ultra-violet radiations within short periods of time. In order that the cost of the treatment may be kept to the lowest possible minimum, the accessory equipment must be simple in construction and capable of efficient and uniform operation without the necessity of providing especially trained or skilled labor. The equipment assembly and operation which least disturbs the usual routine of milk plant activities is obviously most desirable. Since the active radiations do not penetrate milk to any appreciable depth, 0.1 mm., and since the activation of the pro-vitamin is dependent upon direct exposure to the radiant energy, all particles of the milk must come in contact with the rays.

A certain portion of the antirachitic wave lengths, as well as longer wave lengths, are reflected from the milk surface.<sup>6</sup> The amount of such reflection is dependent upon the character and intensity of the radiations and angle of incidence. Suitable methods for the application of the energy and its uniform distribution must be provided in order to maintain a proper intensity of the incident radiations. This involves a determination of the distance from the source of energy to the milk film, and the use of reflectors of predetermined design and placement. These observa-

tions will serve to illustrate that the mechanics of milk irradiation from a commercial point of view involves more than an incidental and promiscuous exposure to ultra-violet rays. Such determinations are of importance in so far as they permit progress in the standardization and synchronization of the operating details necessary for the uniform production of a dependable and satisfactorily activated milk suitable for commercial distribution. The industrial irradiation of milk not only demands a simple and inexpensive method based upon specifications, but the results must meet the requirements of a critical clientele; the treated product must be acceptable to the public and its enhanced nutritive properties must be measurable in terms of benefit to the human subject and not solely in terms of laboratory assays.

A commercial method has been developed wherein these results are achieved. The method has been subjected to the crucial test of nearly 6 years' continuous operation in a commercial milk plant.<sup>7, 8</sup> The basic features mentioned, as well as others of equal or greater importance, have been embodied in this unit, having a normal capacity for the treatment of slightly more than 5,000 quarts of milk per hour. The milk is exposed uniformly in the form of a moving film which receives the rays at constantly changing angles of incidence, varying from 0 to 90°. The cycle of exposure to this range of impingement angles requires approximately 0.3 seconds. The thickness of film is maintained at substantially 0.4 mm.; the time of exposure does not exceed 16 seconds. In addition to the arc lamps and electrical accessories the equipment is similar to that common in many milk plants. Carbon arcs of the flaming arc type are used. Synchronized units for which standard data have been determined may be assembled with a capacity of as low as 625 quarts

per hour; larger units may be assembled in any multiple of this minimum, and operated with equivalent efficiency.

The intensity of the radiations applied per unit of time is of paramount importance in determining the degree of antirachitic potency. A high intensity or a high rate of energy input per unit of time is necessary, not only for obtaining a satisfactory degree of potency, but also for the prevention of deleterious secondary reactions. Extended investigations<sup>6, 7, 8</sup> have shown that the synthesis of the antirachitic factor in milk is practically instantaneous, providing a suitable quality and quantity of radiant energy is used in conjunction with a perfected mechanism permitting an exposure of the provitamin to such energy. In contrast with this, the development of objectionable features requires a time factor of greater duration than that required for antirachitic activation. The development of adverse manifestations is due primarily, if not solely, to an extended exposure, rather than to specific wave lengths within the now known antirachitic range. The practical significance of these observations is that with suitable radiations of sufficiently high intensity the conversion of a relatively large proportion of the antirachitic pro-vitamin takes place before other secondary reactions are manifested.

Various sources of radiation are capable of yielding a suitable quality and quantity of energy for the activation of milk under the conditions described. However, those sources from which the energy emission is constant and least subject to external influences, are to be preferred. Certain carbon arc sources are particularly suited to meet commercial requirements.<sup>7, 8, 9</sup> The carbon arc is of such a nature that under constant electrical conditions, namely, constant current and voltage, of the arc stream between electrodes of a

# Production of Antirachitic Milk by the Feeding of Dairy Cattle\*

J. G. HARDENBERGH, V.M.D., AND L. T. WILSON, PH.D.

*Research Laboratories, Walker-Gordon Laboratory Company, Inc.,  
Plainsboro, N. J.*

MILK has few defects as a perfect and complete food; it more nearly satisfies the requirements of complete nutrition than does any other single food product. The recognition of the defects of milk, and the character of these, constitutes an interesting chapter in the biological chemistry of recent years. It is known from chemical analysis that good milk contains excellent—if not optimum—proportions of protein, fat and carbohydrates, and of calcium and phosphorus; but it has taken the newer bio-assay methods to evaluate milk on the basis of its content of essential biologic factors such as vitamins, and certain mineral elements such as iron and copper.

A few years ago the evaluation of food products as to available nutrients was largely a matter of chemical analysis and calorimetry. It has been appreciated only within recent years that two bottles of milk—identical in composition according to the usual chemical tests—can be widely different in nutritive values. The idea and the ideal of “building” a milk of optimum biologic value is relatively new. While the use of various supplements to make up for the deficiencies which commonly occur in modern dietaries may be satis-

factory, we feel that it is well worth while to make our common foods nutritionally more complete. It has been said by a leading authority on nutrition that “the place to get vitamins is in the market, in the grocery store, from the milk man, and from the garden, and not from the drug store.” The one exception to this has been in regard to vitamin D, which occurs in most common foodstuffs in only very limited amounts.

It was recognized that the composition of cow's milk with respect to its content of proteins, fat, lactose, and some of the minerals, is largely under physiological control and not appreciably influenced by the feed of the cow, although with respect to some of the vitamins and other less known biologic factors, milk does show considerable variation, depending upon the feeds furnished the cow, and there is thus introduced seasonal fluctuations in the nutritive and biologic character of the product.

Beginning in 1925, studies on the nutritional qualities of our milk have been made continuously in the laboratories of the Department of Chemistry of Columbia University. The vitamin A, B, (B<sub>1</sub>), C and G (B<sub>2</sub>) values were determined at all seasons of the year. The results “indicate that a milk which is produced under excellent conditions of stall-feeding is a uniform and good source” of the vitamins mentioned.<sup>1, 2</sup>

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

Fraps and Treichler<sup>3</sup> found that "the butter fat from cows fed cottonseed meal and hulls, at the end of 15 to 16 months contained about 2 units of vitamin A to the gm. Cows fed silage, in addition to the cottonseed meal and hulls, produced butter fat containing about 2 to 12 units of vitamin A to the gm.; cows having access to a pasture in addition, produced normal butter fat containing about 33 units of vitamin A to the gm." On a comparative basis, the stall-fed cows referred to<sup>2</sup> produced butter fat containing from 33 to 50 units of vitamin A per gm.

#### STUDIES ON INCREASING VITAMIN D IN MILK

It was recognized that all milks as ordinarily produced are relatively poor sources of vitamin D. This is true of the various species, including man. It was decided to investigate the practicability of increasing the antirachitic potency of cows' milk by feeding vitamin D-rich supplements.

In 1924, Luce<sup>4</sup> reported that the diet of the cow appeared to be the main factor in determining the antirachitic potency of her milk. Wagner<sup>5</sup> in 1926, found that cows fed for 7 months with large doses of cod liver oil produced milk with no appreciable corrective properties for rickets in infants. Feeding cod liver oil is not a practical method of increasing vitamin D because of the marked depressing effect upon the fat content. In 1929, Wachtel<sup>6</sup> showed that the vitamin D may be increased by feeding irradiated yeast. In 1930, Steenbock and his coworkers<sup>7</sup> reported that they had been able to increase the vitamin D by feeding 50 gm. of irradiated yeast daily.

Our first experiments were started in April, 1930. Both irradiated yeast and irradiated ergosterol were fed and compared as sources of vitamin D for dairy cattle. Three groups of cows were fed different levels of irradiated yeast; 3

groups were fed irradiated ergosterol; and 1 group served as controls. The experiment extended over a period of 4 months.

At the end of this period, samples were collected from each group, and the butter fats separated and tested for their vitamin D potencies. The results have been reported by Thomas and MacLeod.<sup>8</sup> It was found that the highest levels of irradiated yeast and of irradiated ergosterol both increased the vitamin D potency of the milk to 16 times that of milk from cows receiving no supplement.

The results of this preliminary work seemed so promising that it was decided to repeat some phases of it and to subject the activated milks to critical clinical tests. In December, 1930, another experiment was started in which the supplements mentioned were again used. Since the milk was to be used over a prolonged period for baby feeding incident to the clinical trials, larger groups of cows were required. The cows were selected so that the milk from each group of 8 tested as nearly 4 per cent butter fat as possible; "master" rations containing the vitamin D supplements were prepared with exactness; a special man was detailed to insure proper feeding of the groups and a group of replacement cows was maintained so that any animal in the experiment could be replaced if necessary. In all, 50 cows were included in the investigation.

The results of this experiment, which confirmed those of the first, are summarized in Table I.

It will be noted that the groups (F and Y) receiving the higher levels of irradiated ergosterol and of irradiated yeast produced milk the butter fats from which showed potencies 32 times as great as those from the control group. This gives a milk containing approximately 160 units of vitamin D per qt. of 4 per cent milk.

## CLINICAL INVESTIGATIONS

The second experiment was planned so that clinical tests on the milk could be carried out. It was recognized that such tests were essential to determine the practical value of the milks so produced.

Tests were started in New York City early in January, 1931, by Hess and his associates. The milks from the 4 groups in the experiment described (Groups E, F, X and Y, Table I) were fed to 102 infants (about 25 in each group) as their only source of vitamin D. The test was essentially prophylactic, but some of the babies showed evidences of rickets at the beginning, so that it served as a curative test as well. The infants were examined, physically and by X-ray, before, during and at the end of the test, and were under close observation at all times.

Hess and his coworkers reported the results in June, 1931,<sup>9</sup> and stated that "of the four test milks, all except the weaker 'yeast milk' were found, almost without exception to prevent as well as to cure rickets." It was pointed out that by the use of the specially activated milk, the specific antirachitic factor is incorporated in the diet, thus functioning automatically and relieving the physician of dependence on the mother for administering other antirachitic agents.

It was considered advisable to carry as many babies as possible through the summer and second winter. This was done in order to answer possible questions relative to the effects of milk with high vitamin D content taken during the summer months, and also to be sure that such milks would be fully effective over prolonged periods. Accordingly, about half the babies were continued on the test until April, 1932, making a total of 15 months during which they received the special milks from the groups of cows receiving the higher levels of irradiated yeast and of

irradiated ergosterol (Groups F and Y, Table I) as their only source of vitamin D.

Hess and Lewis state<sup>10</sup> that these infants thrived, did not develop rickets in the second winter, and that the bones showed excellent calcification on roentgenologic examination.

At the same time a clinical test was undertaken in Boston by Wyman and Butler at the Infants' and Children's Hospital. A group of cows was selected and specially fed on the higher yeast level, i.e., 60,000 units daily per cow, at the Walker-Gordon farm at Charles River, Mass. The milk was used as a curative for rickets rather than as a prophylactic. Four cases of advanced active rickets were selected, carefully examined as to physical, X-ray and blood chemistry findings, and were hospitalized prior to and during the test. In all cases, the milk was pasteurized and, in one case, was boiled for 5 minutes in addition.

Wyman and Butler conclude<sup>11</sup> that the milk used "was an effective source of antirachitic substance as determined by its ability to cause healing in advanced active rickets in infants and advanced chronic rickets in children. After 5 minutes' boiling the milk still possessed antirachitic properties." Also "the substitution of this milk for the ordinary milk in the formulas of infants would introduce an effective prophylactic and curative agent against rickets requiring a minimum of coöperation on the part of the mother." Incidentally, laboratory tests have also shown that pasteurization or boiling does not reduce the antirachitic values of milk produced by the supplement-feeding method.

#### EFFECT OF "VITAMIN D" MILK ON THE ANTIRACHITIC POTENCY OF HUMAN BREAST MILK

The status of human milk in respect to its antirachitic potency is not clear. Although breast-fed babies are less sub-



TABLE I

Group	Supplement Fed	Rat Units of Vitamin D Fed Per Cow Per Day	Amount of B.F. Containing 1 Rat Unit—Grams	Relative Potencies
Control	none	.....	8.0	1
E	Irradiated Ergosterol	100,000	0.5	16
F	Irradiated Ergosterol	200,000	0.25	32
X	Irradiated Yeast	30,000	0.5	16
Y	Irradiated Yeast	60,000	0.25	32

ject to rickets than bottle-fed babies, nevertheless the milk of the nursing mother ordinarily contains little, if any, of the antirachitic factor as determined by the rat test. Breast-fed babies require less of the antirachitic factor as we usually think of it than babies fed cows' milk.

An interesting test has just been completed at the Florence Crittenden Home in Boston, in which a group of nursing mothers were fed vitamin D milk. Samples of breast milk were obtained, pooled, and bio-assayed, and compared in potency with control samples of breast milk from mothers taking no antirachitic supplement. Bunker, Harris and Eustis<sup>12</sup> show that an appreciable increase in antirachitic potency of human breast milk takes place when vitamin D milk is included in the diet of the mother during lactation. They point out that this is a simple and acceptable manner of augmenting the antirachitic potency of human breast milk.

We believe that vitamin D in the diet of the mother should also have a special value as a protection against the depletion of calcium and phosphorus from her body which may occur during pregnancy and lactation.

#### PRODUCTION OF ANTIRACHITIC FLUID MILK

The experiments briefly recounted here have involved a number of con-

siderations of great fundamental importance in practical application. These include the selection of a suitable antirachitic supplement for feeding the cows, the desirable potency to be attained in an antirachitic milk, the maintenance of uniform potency, the potency of and amount of supplement to be fed, the effects of prolonged administration of vitamin D-rich supplements on the health of dairy cattle, adequate control methods to insure reliable potency, and so on. Fortunately the experiments were so set up that the answers to many of these questions were readily obtained; special studies have been and are being made to answer others. The data brought out by Thomas and MacLeod in the experimental work with cows, by Hess and by Wyman and their associates in the clinical studies have served as the basis of methods and standards for the production of antirachitic fluid milk by the supplement-feeding method.

#### VITAMIN D SUPPLEMENTS FOR FEEDING DAIRY CATTLE

So far, the results indicate that irradiated dried yeast of known potency is the supplement of choice. It is easily incorporated in the grain ration by thorough mixing to insure uniform distribution. As noted by Thomas and MacLeod, some antirachitic supplements may be utilized more efficiently than others by the dairy cow (Table I). On the basis of total rat units fed, irradiated yeast proved approximately 3 times as effective as irradiated ergosterol in producing milk of a given potency. The fact is clearly indicated by the data cited, but doubtless there are various factors for which allowance must be made before final conclusions are drawn.

#### AMOUNT OF YEAST IN RELATION TO POTENCY OF MILK

In the clinical tests made by Hess and his associates, the results indicated that

## CLINICAL INVESTIGATIONS

The second experiment was planned so that clinical tests on the milk could be carried out. It was recognized that such tests were essential to determine the practical value of the milks so produced.

Tests were started in New York City early in January, 1931, by Hess and his associates. The milks from the 4 groups in the experiment described (Groups E, F, X and Y, Table I) were fed to 102 infants (about 25 in each group) as their only source of vitamin D. The test was essentially prophylactic, but some of the babies showed evidences of rickets at the beginning, so that it served as a curative test as well. The infants were examined, physically and by X-ray, before, during and at the end of the test, and were under close observation at all times.

Hess and his coworkers reported the results in June, 1931,<sup>9</sup> and stated that "of the four test milks, all except the weaker 'yeast milk' were found, almost without exception to prevent as well as to cure rickets." It was pointed out that by the use of the specially activated milk, the specific antirachitic factor is incorporated in the diet, thus functioning automatically and relieving the physician of dependence on the mother for administering other antirachitic agents.

It was considered advisable to carry as many babies as possible through the summer and second winter. This was done in order to answer possible questions relative to the effects of milk with high vitamin D content taken during the summer months, and also to be sure that such milks would be fully effective over prolonged periods. Accordingly, about half the babies were continued on the test until April, 1932, making a total of 15 months during which they received the special milks from the groups of cows receiving the higher levels of irradiated yeast and of

irradiated ergosterol (Groups F and Y, Table I) as their only source of vitamin D.

Hess and Lewis state<sup>10</sup> that these infants thrived, did not develop rickets in the second winter, and that the bones showed excellent calcification on roentgenologic examination.

At the same time a clinical test was undertaken in Boston by Wyman and Butler at the Infants' and Children's Hospital. A group of cows was selected and specially fed on the higher yeast level, i.e., 60,000 units daily per cow, at the Walker-Gordon farm at Charles River, Mass. The milk was used as a curative for rickets rather than as a prophylactic. Four cases of advanced active rickets were selected, carefully examined as to physical, X-ray and blood chemistry findings, and were hospitalized prior to and during the test. In all cases, the milk was pasteurized and, in one case, was boiled for 5 minutes in addition.

Wyman and Butler conclude<sup>11</sup> that the milk used "was an effective source of antirachitic substance as determined by its ability to cause healing in advanced active rickets in infants and advanced chronic rickets in children. After 5 minutes' boiling the milk still possessed antirachitic properties." Also "the substitution of this milk for the ordinary milk in the formulas of infants would introduce an effective prophylactic and curative agent against rickets requiring a minimum of coöperation on the part of the mother." Incidentally, laboratory tests have also shown that pasteurization or boiling does not reduce the antirachitic values of milk produced by the supplement-feeding method.

#### EFFECT OF "VITAMIN D" MILK ON THE ANTIRACHITIC POTENCY OF HUMAN BREAST MILK

The status of human milk in respect to its antirachitic potency is not clear. Although breast-fed babies are less sub-

TABLE I

Group	Supplement Fed	Rat Units of Vitamin D Fed Per Cow Per Day	Amount of B.F. Containing 1 Rat Unit—Grams	Relative Potencies
Control	none	.....	8.0	1
E	Irradiated Ergosterol	100,000	0.5	16
F	Irradiated Ergosterol	200,000	0.25	32
X	Irradiated Yeast	30,000	0.5	16
Y	Irradiated Yeast	60,000	0.25	32

ject to rickets than bottle-fed babies, nevertheless the milk of the nursing mother ordinarily contains little, if any, of the antirachitic factor as determined by the rat test. Breast-fed babies require less of the antirachitic factor as we usually think of it than babies fed cows' milk.

An interesting test has just been completed at the Florence Crittenden Home in Boston, in which a group of nursing mothers were fed vitamin D milk. Samples of breast milk were obtained, pooled, and bio-assayed, and compared in potency with control samples of breast milk from mothers taking no antirachitic supplement. Bunker, Harris and Eustis<sup>12</sup> show that an appreciable increase in antirachitic potency of human breast milk takes place when vitamin D milk is included in the diet of the mother during lactation. They point out that this is a simple and acceptable manner of augmenting the antirachitic potency of human breast milk.

We believe that vitamin D in the diet of the mother should also have a special value as a protection against the depletion of calcium and phosphorus from her body which may occur during pregnancy and lactation.

#### PRODUCTION OF ANTIRACHITIC FLUID MILK

The experiments briefly recounted here have involved a number of con-

siderations of great fundamental importance in practical application. These include the selection of a suitable antirachitic supplement for feeding the cows, the desirable potency to be attained in an antirachitic milk, the maintenance of uniform potency, the potency of and amount of supplement to be fed, the effects of prolonged administration of vitamin D-rich supplements on the health of dairy cattle, adequate control methods to insure reliable potency, and so on. Fortunately the experiments were so set up that the answers to many of these questions were readily obtained; special studies have been and are being made to answer others. The data brought out by Thomas and MacLeod in the experimental work with cows, by Hess and by Wyman and their associates in the clinical studies have served as the basis of methods and standards for the production of antirachitic fluid milk by the supplement-feeding method.

#### VITAMIN D SUPPLEMENTS FOR FEEDING DAIRY CATTLE

So far, the results indicate that irradiated dried yeast of known potency is the supplement of choice. It is easily incorporated in the grain ration by thorough mixing to insure uniform distribution. As noted by Thomas and MacLeod, some antirachitic supplements may be utilized more efficiently than others by the dairy cow (Table I). On the basis of total rat units fed, irradiated yeast proved approximately 3 times as effective as irradiated ergosterol in producing milk of a given potency. The fact is clearly indicated by the data cited, but doubtless there are various factors for which allowance must be made before final conclusions are drawn.

#### AMOUNT OF YEAST IN RELATION TO POTENCY OF MILK

In the clinical tests made by Hess and his associates, the results indicated that

a desirable potency was present in those milks which on the basis of bio-assays, contained approximately 160 rat units of vitamin D per qt. This potency was effective in preventing and curing rickets in babies and children, the curative effectiveness being especially well demonstrated in the cases reported by Wyman and Butler.

Subsequently, 150 to 160 rat units of vitamin D per qt. of milk has become generally accepted and adopted as the standard of potency. To obtain this and keep it uniformly reliable requires careful supervision over a number of factors. Obviously, the first requirement is a yeast of known and standard potency. The manufacturers (Standard Brands, Inc.) have developed methods whereby a standardized product having a definite minimal antirachitic potency is available. The potency of this yeast is approximately 30-D and contains about 400 rat units per gm.

The dry powdered yeast is preferably incorporated into the grain ration, and thoroughly mixed to insure uniform distribution. This system insures more or less automatic and regular feeding of the yeast, and provides automatic adjustment of the amount fed to the requirements of the individual cow, since it is good dairy practice to feed grain in proportion to the amount of milk produced, and it is known that the yeast requirement for a given potency of the milk is proportional to the amount being produced. This has been determined by results obtained on individual cows, reported by Hess and associates<sup>13</sup> and by results on milk for a number of herds reported by Frey and Light.<sup>14</sup>

In deciding how much yeast must be incorporated in the grain mixture to give a certain potency to the milk, the two main considerations are (1) the amount of grain being fed, and (2) the amount of milk being produced. Frey

and Light of the Fleischmann Laboratories<sup>15</sup> have drawn up the following formula:

$$\frac{Q \times 160}{X} \times \frac{100}{454} \times \frac{1}{F} = \begin{array}{l} \text{per cent of yeast to} \\ \text{be included in the} \\ \text{grain concentrate} \end{array}$$

Q equals total quarts produced by all cows to be fed yeast

X equals For 45 lb. production — 9.2

For 37.5 " " 8.7

For 30 " " 8.4

For 25 " " 7.9

F equals total lb. of grain fed to all the cows to be fed yeast

This formula is based on a required potency of 160 units of vitamin D per qt.

Such a formula serves essentially as a guide and does not take into consideration all of the known or unknown factors involved. It is known that feeding 3 times daily gives better results than twice daily and, twice daily is more satisfactory than once a day. Whether or not the desired results are being fully attained can be determined only by bio-assays on the milk. Frey states<sup>15</sup>: "We are confident, as the result of a large amount of experimental work, that once the proper level has been reached—in other words, 160 Steenbock units per quart—it will not be necessary, provided the cows are kept under the same conditions, to test the milk each month. We believe that the feeding if accurately done, is sure to produce the desired potency in the milk."

Another point is the fact brought out by Russell<sup>16</sup> that it takes about 20 days after yeast feeding has started before the milk reaches its maximum potency.

The cost of the yeast, calculated on the basis of 6/10 lb. per day for a cow producing 15 qt. of milk, at the present price amounts to about 1 cent per qt. In addition there is a fee for a license to use the yeast, and the expense of making such tests on the milk as may be required.

### EFFECT OF CONCENTRATED VITAMIN D SUPPLEMENTS ON THE HEALTH OF COWS

It was considered important to note the effects of feeding concentrated vitamin D on the health of the cows. This has been done both with the experimental groups and with those that are used in the commercial production of antirachitic milk for general distribution; our cows are under constant observation as to general health, appetite, and production of normal milk, and they have daily veterinary supervision. The general health of the animals has at all times been excellent over a period of more than 1½ years. There has been no detrimental effect on the productiveness of the cows and the physical character and taste of the milk remain unaltered.

We have coöperated in an experiment in which excessive amounts of irradiated yeast and irradiated ergosterol have been fed to groups of cows for several months. This was undertaken to hasten and intensify any pathologic conditions that might result from prolonged administration of vitamin D supplements. The results<sup>13</sup> may be summarized as follows:

In cows fed about 10 oz. daily of irradiated yeast—

... no increase in the phosphorus, calcium or ash (of the milk) was found, nor was there an increase in the inorganic phosphorus or calcium content of the serum.

When excessive, non-therapeutic, amounts of irradiated ergosterol were fed, a slight but definite rise in the calcium, phosphorus, and ash content of the milk resulted; these increases were less in the milk of cows which secreted a large volume of milk daily. There was also a rise in the concentration of calcium in the serum and, especially, of phosphorus.

Histological examinations of the various organs of the cows which received excessive amounts of irradiated ergosterol for long periods failed to show any lesions of the cellular structure or of the blood vessels. Analysis of the ash of the bones showed the percentages to be within normal limits.

### RELATIVE EFFECTIVENESS OF ANTIRACHITIC MILKS

One of the striking observations incident to the studies reviewed here, and referred to in another report on activated milk<sup>10</sup> is the rather remarkable antirachitic effectiveness of such milks when compared, on the basis of rat unit potency, with other antirachitic agents such as cod liver oil and viosterol. On the basis of the number of rat units present, vitamin D milk as we have described it is more effective than either of the other two substances. As pointed out by Hess,<sup>8</sup> the ratio is, 1:1.25:5.2. This means that 1 qt. of this milk, representing 160 units, has the efficiency in preventing rickets of 15 c.c. of standard cod liver oil (200 units) or of 10 drops of viosterol (830 units). It may be well to repeat that milk has excellent proportions of calcium and phosphorus, the very mineral essentials which are mobilized by the antirachitic factor, and other biologic factors present in milk of high quality may lend special potency to the product.

### SUPERVISION

It is apparent that the supervision and control of antirachitic milks produced as described here, or by any other method, are matters for consideration by health authorities and food control officials. It is of the utmost importance that the production of such special milks be surrounded with adequate safeguards to protect the consumer and to prevent the marketing of sub-standard products which might reflect discredit upon qualified products. Some progress has already been made in this direction. The Wisconsin Alumni Research Foundation exercises legal control over the irradiation of various products, including yeast, for the feeding of animals. It requires a license to dairymen who wish to produce vitamin

D milk by feeding irradiated yeast, which stipulates conditions under which the yeast may be used and provides steps by which the potency of the milk produced may be controlled.

We recognize the necessity for periodic bio-assays to check the potency of vitamin D milk. These may be made in official laboratories, or in other recognized and competent laboratories under official sanction. In the case of certified milks, the methods and standards provide that the production of antirachitic milk shall be subject to the approval of the local authorities and the medical milk commissions. In one instance, the research division of a large city department of health has developed a laboratory where official bio-assays will be made. It is anticipated that the results of tests made in that laboratory will serve for a number of local medical milk commissions and the department of health, so that duplication of tests and unnecessary expense will be avoided. Also there are two qualified institutional laboratories, besides the University of Wisconsin, which are in a position to make routine tests for control.

The experience required for making reliable bio-assays for vitamin D, the relative scarcity of laboratories qualified for this kind of work, and the expense of a single test, are factors which make the routine control of antirachitic milks a problem for careful consideration. The problem is simplified somewhat by the fact that the potency of these milks can be controlled within reasonable limits by the method of production. The bio-assays must serve as a check on the efficiency and integrity of the producer. The

application of these methods must be considered as in the developmental stage, requiring the interest and help of all who would like to see milk made more complete in biologic values.

#### REFERENCES

1. MacLeod, Florence L. Antiscorbutic vitamin content of milk of stall-fed cows through a year. *J. A. M. A.*, 88:1947-1949 (July 18), 1927.
2. MacLeod, Florence L.; Brodie, Jessie B.; and Macloon, Emily R. The vitamin A, B, (B<sub>1</sub>), and G (B<sub>2</sub>) contents of milk throughout the year. *J. Dairy Sci.*, 15:14-22 (Jan.), 1932.
3. Fraps, G. S., and Treichler, R. Quantitative variations in vitamin A content of butter fat. *Indust. & Eng. Chem.*, 24:1079-1081 (Sept.), 1932.
4. Luce, E. M. The influence of diet and sunlight upon the growth-promoting and antirachitic properties of the milk afforded by a cow. *Biochem. J.*, 18: 716-739, 1932.
5. Wagner, R.; Wimberger, H.; Löury, L.; Luce, E. M., and Müller, H. *Ztschr. f. Kinderh.*, 40:295, 1926.
6. Wachtel, M. Die vermehrung und vitamin-reicherung der muttermilch und kuhmilch mittels bestrahlter hefe. *München. med. Wchnschr.*, 76:1513-1514, 1929.
7. Steinhock, H.; Hart, E. B.; Hanning, Flora, and Humphrey, G. C. Fat-soluble vitamins. XXX. The antirachitic value of cow's milk as modified by the feeding of irradiated yeast. *J. Biol. Chem.*, 88:197-214 (Aug.), 1930.
8. Thomas, B. H., and MacLeod, Florence L. Increasing the vitamin D potency of cows' milk by the daily feeding of irradiated yeast or irradiated ergosterol. *Science*, 73:618, 1931.
9. Hess, A. F.; Lewis, J. M.; MacLeod, F. L., and Thomas, B. H. Antirachitic potency of the milk of cows fed irradiated yeast or ergosterol: A clinical test. *J. A. M. A.*, 97:370-374 (Aug. 8), 1931.
10. Hess, A. F.; and Lewis, J. M. Milk irradiated by carbon arc lamp: A clinical and laboratory study of rickets. *J. A. M. A.*, 99:652 (Aug. 20), 1932.
11. Wyman, Edwin T., and Butler, Allen M. Antirachitic value of milk from cows fed irradiated yeast. *Am. J. Dis. Child.*, 43:1509-1518 (June), 1932.
12. Bunker, John W. M.; Harris, Robert S.; and Eustis, Richard S. The antirachitic potency of the milk of human mothers fed previously on "Vitamin D" milk of the cow. In press.
13. Hess, Alfred F.; Light, Robert F.; Frey, Charles N.; and Gross, Joseph. A study of the milk, blood and excreta of cows fed moderate and excessive amounts of irradiated yeast or ergosterol. *J. Biol. Chem.*, 97:369-377 (Aug.), 1932.
14. Frey, C. N., and Light, R. F. Discussion of vitamin D milk. *Certified Milk*, 7, 76:1-3 (Aug.), 1932.
15. Personal communication.
16. Russel, H. L. Vitamin "D" milk: The latest step in certified milk improvement. *Certified Milk*, 7, 75:1-4 (July), 1932.

NOTE: This is the last paper of the Symposium on Milks of Special Antirachitic Value. Other papers appeared in the Journal for December, 1932, and January, 1933. The Report of the Committee on Milk and Dairy Products will appear in the Year Book.

# Relationships of Leucocytes and Streptococci to Fibrosis of the Udder\*

G. J. HUCKER, PH.D.

*New York State Agricultural Experiment Station, Geneva, N. Y.*

THE significance of the presence of long-chained streptococci and cells in milk has long been a problem for milk control officials who are interested in detecting udder infections. The problem has received considerable attention by various investigators who have studied the flora of the so-called "normal" udder in an attempt to determine definitely the types of streptococci harbored in udders that are apparently normal to the casual observer. In many instances also the cell content of the milk has been studied in an effort to learn whether milk from udders which have been considered normal in most respects contain an appreciable number of cells. In such investigations milk has been selected which was normal in appearance and from cows which to all appearances were normal.

It has been pointed out by Udall and Johnson (1930) that cows may give milk that is regarded as normal although the udder may show signs of infection in the form of indurated tissue. This indurated or fibrotic tissue which is thought to be a result of the breaking down of the glandular structure and its replacement by white fibrous tissue, imparts hardened areas to the udder which may be detected by manual examination. It has been assumed that individuals showing this scar tissue

have at some time been infected, and that these indurated or fibrotic conditions found upon physical examination are the result of this infection. Certain investigators believe that once a quarter has been infected and these indurated areas developed, the quarter will never become entirely free of the infection. Under such conditions the infection is liable to re-occur at certain intervals. Other workers have preferred to believe that this scar tissue is only the result of an infection. Under such a condition it would be possible for an infection to run its course and the udder become entirely free from the invading organism and its effects, viz., leucocytes, the scar tissue remaining as an inert evidence of the breaking down of the secreting tissue. If this view is correct, the presence of scar tissue would have little significance as a means of detecting cows in a herd that may harbor infection and serve as foci of infection of the entire herd. Under such conditions scar tissue must be interpreted as meaning that the cow either is or has been infected.

On the other hand, if it is found that once a cow is infected the infecting organism always remains in the udder awaiting the proper condition for a subsequent attack upon the tissues, the presence of scar tissue becomes an important criterion for detecting cows with chronic mastitis. The question resolves itself into a study of the significance of the indurations. Does a

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

fibrotic condition indicate a circumscribed lesion or rather a mass of inert white fibrous tissue which may contain no evidence of an infecting organism?

It has been pointed out by Hucker, Trudell and Jennings (1932) that all studies pertaining to udder flora and the constituents of milk should be carried out by using milk known to come from cows which have been subjected to a careful physical examination. If the results are to be considered as studies of milk from "normal" udders or udders known to be free from previous infections, these normal udders should be found to be free from fibrotic tissue.

The purpose of the present investigation has been to learn the relationship between the presence of cells and streptococci in milk and the presence of indurations or scar tissue in the udder.\*

#### METHODS

Regular weekly quarter samples of milk from approximately 150 cows have been examined by the methods outlined by Hucker, Trudell and Jennings (1932) over a period of 10 months. The udders from which these samples have been secured have been examined at irregular intervals for the presence of white fibrous tissue, by the methods proposed by Udall and Johnson (1930). Such a routine not only gave information regarding the flora and leucocyte content of the milk but the pathological condition of the udders.

#### DEFINITION OF TERMS

As pointed out by Hucker, Trudell and Jennings (1932) two types of mastitis are recognized based upon external evidences, viz., clinical and sub-clinical. The clinical type, referred to by many

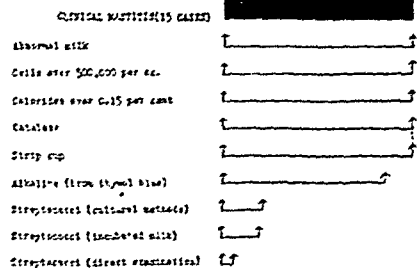
as active or acute, is relatively rare and involves an extreme toxic condition with occasional systemic disturbances. In sub-clinical (latent, chronic) type the individual may appear normal in most respects but the milk reacts in varying degrees to laboratory tests for mastitis and demonstrable scar tissue appears in the udder. Although the sub-clinical type may become more acute at certain intervals the condition never assumes the extreme conditions noted in clinical mastitis. In aggravated cases of sub-clinical types the milk may become broken down with little evidence of toxemia in the individual.

#### DATA

##### THE EFFICIENCY OF THE VARIOUS LABORATORY TESTS IN DETECT- ING CLINICAL MASTITIS

*Clinical Mastitis*—The condition of the individual suffering from acute mastitis is so obvious that no tests are required for its detection. If milk can be obtained from the affected quarter it is (Figure I) always broken down with

FIGURE I—EFFICIENCY OF VARIOUS  
TESTS UPON MILK TO DETECT  
MASTITIS



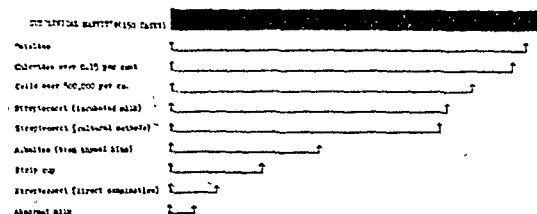
either a watery or serous appearance. The reaction is pH 6.9 to 7.4 and the catalase content is high while the amount of chlorides is always above normal.

It is only with difficulty that organisms can be isolated from the secretion of the infected quarter. Direct

\* It is realized that voluminous literature exists dealing with the relationship of leucocytes and streptococci in the udder and their significance in udder infections. A complete bibliographic review is being prepared and will subsequently appear. For a complete published discussion of this subject reference should be made to Breed (1914).



FIGURE II—EFFICIENCY OF VARIOUS TESTS UPON MILK TO DETECT MASTITIS



microscopic examination, even of samples previously incubated, rarely reveals long chained streptococci, while cultural methods add little more possibility of isolating organisms.

THE EFFICIENCY OF CERTAIN LABORATORY TESTS IN DETECTING SUB-CLINICAL MASTITIS

*The relation of fibrous tissue in the udder to the presence of cells in the milk*—The significance of cells in milk has received considerable attention. Breed, after a detailed study of a series of cows, concluded that there were several unknown factors that may influence the number of cells in milk and that care should be taken in interpreting the significance on their presence in milk.

In the present investigation (Table

II, Figure III) it has been found that over a period of 10 months no quarter that was free of indurations or fibrotic tissue discharged at any one time more than 150,000 cells per c.c. On the other hand, even this number were found in only one isolated instance. Ninety-nine per cent of the normal quarters, *i.e.*, quarters free from scar tissue, showed less than 60,000 cells per c.c., while a great majority, *viz.*, 87 per cent, never gave a higher count than 30,000 cells per c.c.

On the other hand, 63 per cent of the quarters showing fibrotic tissue gave milk showing more than 150,000 cells per c.c. It is also interesting to note that 73 per cent of the quarters with a marked fibrosis showed over 500,000 cells per c.c. in the milk.

Hucker, Trudell and Jennings (1932) have pointed out that all quarters showing a cell count greater than 3,000,000 per c.c. give definite evidence of infection. From the results of the present investigation it is safe to conclude that all quarters showing cell counts of more than 150,000 per c.c. should be considered as suspicious, if not definitely proved to be infected with streptococci.

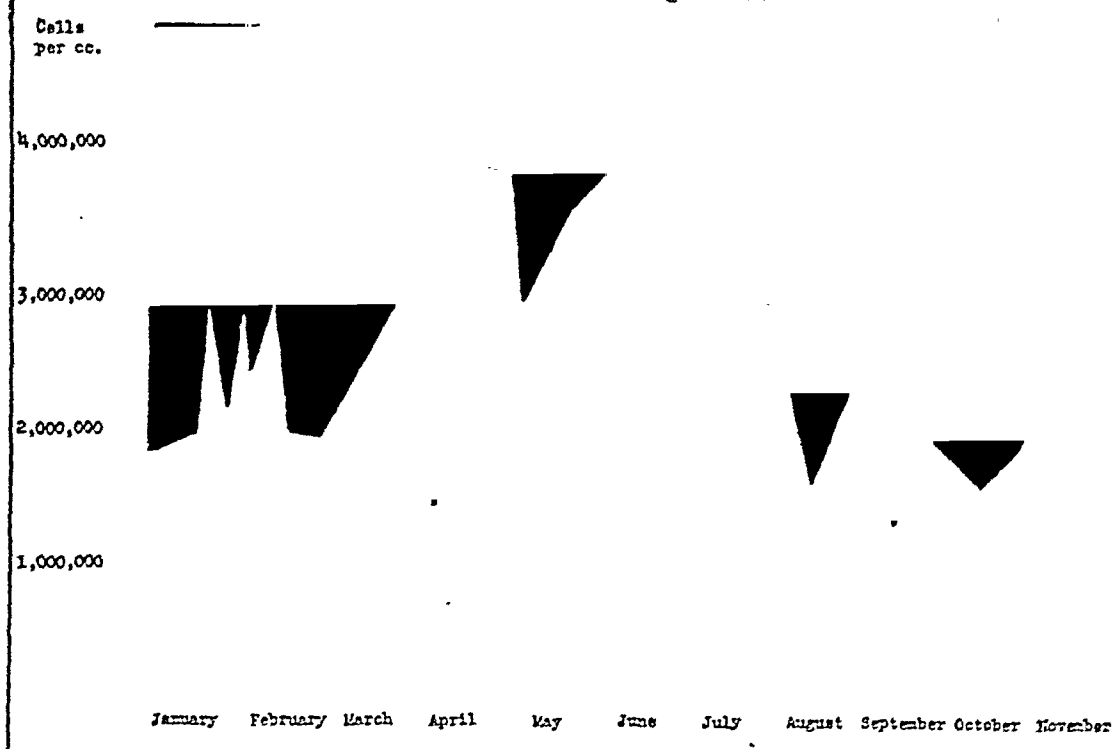
It was also found that not all quarters

TABLE I  
RELATION OF NUMBER OF CELLS PER C.C. IN MILK  
TO THE PRESENCE OF FIBROSIS IN THE UDDER

Amount of fibrosis	Number of quarters studied	Number of tests on each quarter	Per cent showing cells per c.c.						
			Less than 30,000	30,000 to 60,000	60,000 to 150,000	150,000 to 300,000	300,000 to 1,000,000	1,000,000 to 5,000,000	More than 5,000,000
Absent	63	20	87	12	1	0	0	0	0
Slight	68	20	60	3	7	9	7	9	5
Distinct	109	20	25	5	7	11	19	25	8
Marked	24	20	22	5	0	0	18	34	21

Total tests = 5,080.

FIGURE III—MINIMUM NUMBER OF CELLS PER CUBIC CENTIMETER IN MILK FROM 124 "HIGH CELL COUNT" QUARTERS



which show white fibrous tissue discharged an appreciable number of cells. About 25 per cent of the quarters classified as showing distinct or marked fibrosis failed in any instance out of a series of examinations extending over 10 months to show cells in a greater number than 30,000 per c.c. It seems evident that there are two distinct groups of fibrotic quarters, one which never throws off cells and one which constantly, over a long period, will give milk in which the cell count is relatively high. At present it is safe to conclude that cell counts in excess of 150,000 per c.c. are always from quarters which show some degree of fibrosis. However, not all indurated quarters give excessive cell counts.

It has been further observed (Figure III) that once a quarter begins to throw off a large number of cells in the milk the numbers of leucocytes remains relatively large for months or even longer. Over a period of 10 months of observations on so-called "high count"

quarters the minimum number of leucocytes never dropped below 1,000,000 per c.c. In other words, once a large number of leucocytes appear in the milk from any quarter, they rarely diminish.

The same observations were true regarding the milk containing a small number of leucocytes. The maximum (Figure IV) number found in the milk from quarters evidencing no scar tissue when studied over a period of 10 months, never exceeded 200,000 per c.c. The individuals remained over the entire test period as "low cell count" cows.

A certain amount of variation (Figure V) between the leucocyte content of the milk from the 4 quarters of the same individual was noted. One of the most interesting observations in this connection was the fact that a greater variation could be found in the milk from quarters showing an excessive number of leucocytes than milk containing a minimum number.

TABLE II  
RELATION BETWEEN H-ION CONCENTRATION OF THE MILK AND THE  
PRESENCE OF FIBROSIS IN THE UDDER

Amount of fibrosis	Number of quarters studied	Number of tests on each quarter	Per cent showing reaction with Brom thymol blue							
			Light green		Blue green		Blue			
			pH 6.6	pH 6.7	pH 6.8	pH 6.9	pH 7.0	pH 7.1	pH 7.2	pH 7.4
Absent	60	20	95	5	0	0	0	0	0	0
Slight	70	20	81	11	1	3	0	0	0	4
Distinct	85	20	80	3	7	6	0	0	0	4
Marked	22	20	44	5	6	4	9	13	8	11

RELATION OF FIBROTIC TISSUE TO THE  
BROM THYMOL BLUE TEST

For some time the brom thymol blue test has been used in detecting cows that are infected and that should be classed as having mastitis. Its widespread use has raised many questions of interpretation of the results secured.

In ordinary use the results secured by this test have been classed in three groups, viz., light green, which includes

the cows giving normal milk, blue green or the suspicious cows, and dark green which always signifies abnormal conditions. Certain workers have endeavored to make finer distinctions and interpret the results as H-ion readings. The latter although applicable in the laboratory is not recommended for practical barn use.

The results of the present investigations (Table II) with the brom thymol

FIGURE IV—MAXIMUM NUMBER OF CELLS PER CUBIC CENTIMETER IN MILK FROM 112  
"NORMAL" QUARTERS

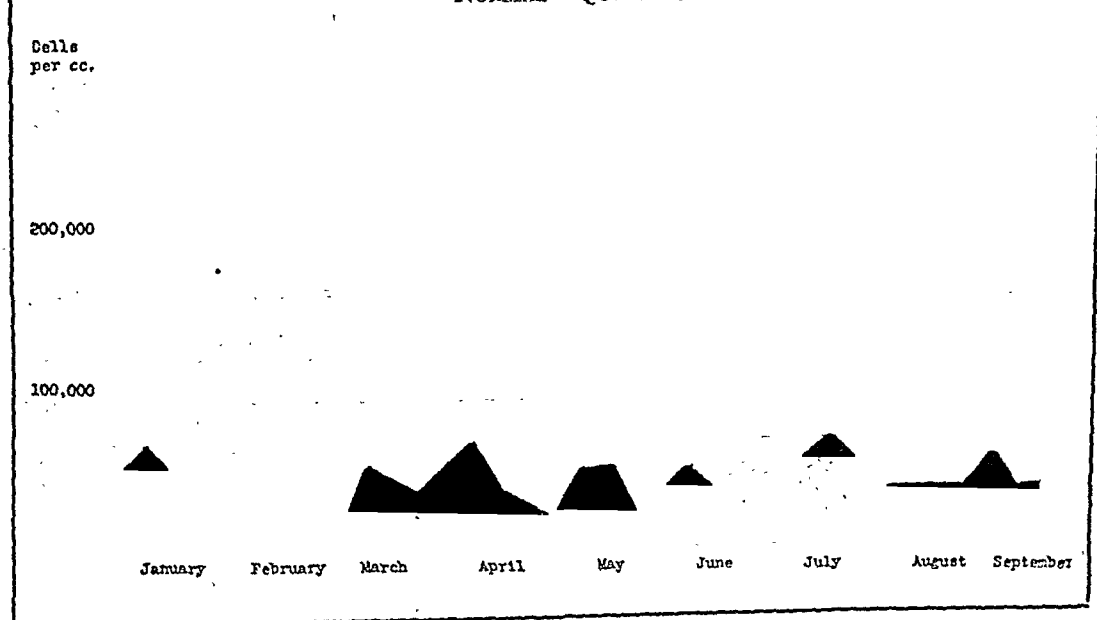
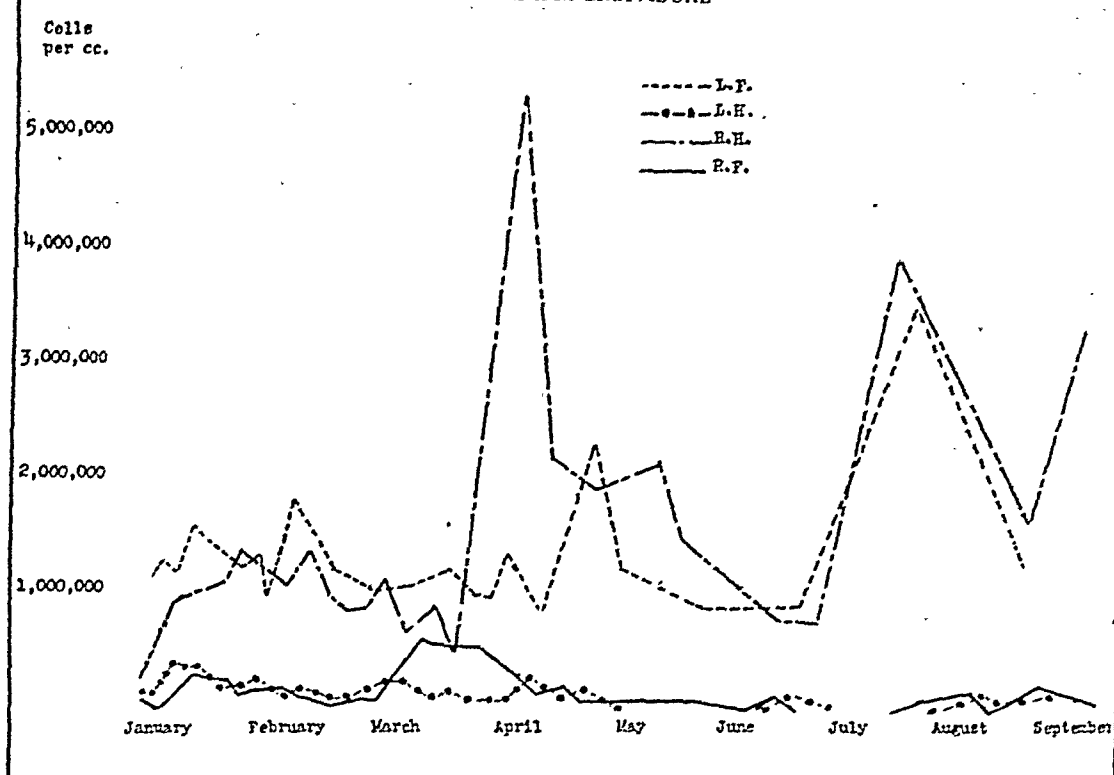


FIGURE V—VARIATION WEEKLY IN NUMBER OF CELLS IN MILK FROM 4 QUARTERS OF THE SAME INDIVIDUAL



blue test are very similar to those secured from a study of the cells and streptococci present. In no instance during the 10-month study did a quarter free of indurated tissue give a positive reaction to brom thymol blue, though not all of the indurated quarters gave positive reactions. It is concluded that a positive reaction by this test always signifies indurated tissue in the udder while fibrosis free quarters never show it.

#### RELATION OF FIBROTIC TISSUE IN THE UDDER TO THE PRESENCE OF STREPTOCOCCI IN MILK

A study of 264 quarters which extended over 10 months showed that only approximately 11 per cent were free from indurations or fibrotic tissue. The remaining 90 per cent showed affected tissue to some extent. The most interesting observation (Table III) in this connection is the fact that no streptococci were found during this

TABLE III  
RELATION OF FIBROSIS IN THE UDDER TO THE PRESENCE OF STREPTOCOCCI IN THE MILK

Amount of fibrosis	Number of quarters studied	Per cent showing streptococci
Absent	30	0
Slight	76	5
Distinct	100	24
Marked	58	10

period in the milk from the quarters that were free of fibrotic tissue. The 30 quarters which by physical examination were found to remain pliable with no hardened areas or indurations were found to remain free of streptococci. From these results it appears probable that where previous investigators found streptococci in the freshly drawn milk an examination of the udder would have shown the presence of fibrotic tissue.

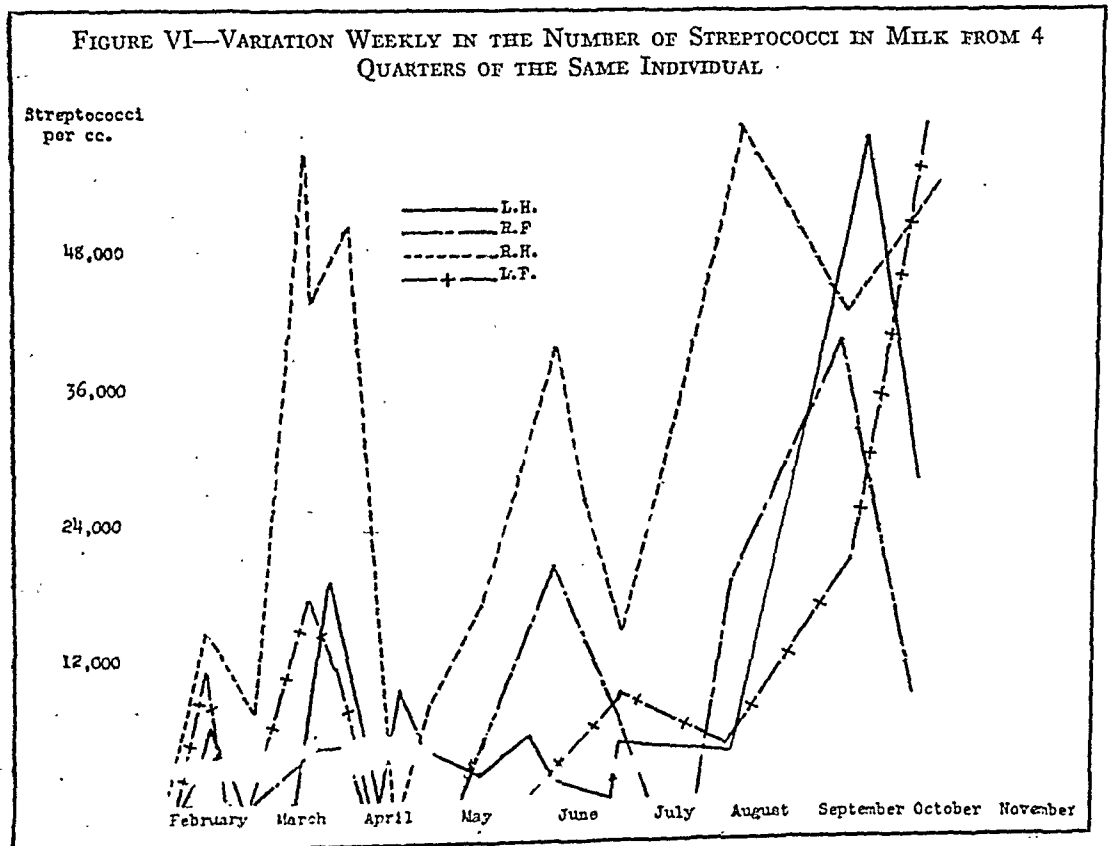
These observations raise the question of the nature of the so-called "normal" flora of the udder. Some workers have assumed that a certain number of streptococci are normal inhabitants of the udder. The above data, however, indicate that such is not the case if normal udders are those that are free from fibrotic tissue. On the other hand, the conclusion should not be drawn that all udders that show indurated tissues will throw off streptococci.

Of the 234 quarters that showed in-

ductions on physical examination, only 39 per cent were found to discharge demonstrable streptococci in the milk. It is also of interest to note that, of the quarters which discharged streptococci, the milk from the majority contained streptococci in all samples, indicating that once streptococci are thrown off, the presence of these organisms is more or less constant. The indurated quarters in which no streptococci were found remained as free from these organisms over the period in which the observations were made as the quarters in which no fibrotic tissue was found. It is concluded that streptococci are found only in milk from udders that have developed fibrotic tissue. Not all indurated udders, on the other hand, eliminate streptococci.

The weekly variation in the number of streptococci in the milk from the four quarters of one individual was found to be excessive. It was noted that at certain intervals the milk from

FIGURE VI—VARIATION WEEKLY IN THE NUMBER OF STREPTOCOCCI IN MILK FROM 4 QUARTERS OF THE SAME INDIVIDUAL



a given quarter (Figure VI) was practically free of long chain streptococci while subsequent examinations showed relatively large numbers of them.

#### RELATION OF STREPTOCOCCI IN MILK TO THE NUMBER OF LEUCOCYTES

A study over 10 months of a composite sample of all four quarters of 133 cows (Table IV) has shown that 78 dis-

somewhat different results than are found in the case of the composite sample. A study of 117 quarters which (Table V) showed a pronounced fibrosis revealed that 20 threw off more than 500,000 cells per c.c. and streptococci were not observed in the milk of any of these quarters.

Observations revealed that cows with one quarter discharging an excessive

TABLE IV  
RELATION OF STREPTOCOCCI TO THE NUMBER OF LEUCOCYTES IN MILK

Number of cows	More than 500,000 cells per c.c.		Less than 500,000 cells per c.c.	
	Streptococci present	Streptococci absent	Streptococci present	Streptococci absent
133	78	0	4	51

charged consistently more than 500,000 cells per c.c. in their milk. A further study of these cows also showed that all contained streptococci at some period during this interval. On the other hand, of the 55 cows showing less than 500,000 leucocytes per c.c. only 4 showed streptococci at any time during these observations. In other words, if kept under observation the milk of cows eliminating large numbers of leucocytes will generally contain long chain streptococci at some period during lactation.

A study of the relationship of the simultaneous presence of cells and streptococci in quarter samples reveals

number of leucocytes will show streptococci in one of the four quarters some time during lactation. However, these streptococci are not always in the quarter showing the large number of cells. On the other hand, not all high cell producing quarters will throw off streptococci.

This peculiar relationship needs investigation to determine whether it is a fact or merely a coincidence.

A further interesting (Table V) observation is the fact that over a period of 10 months' observation 27 of these 117 quarters with pronounced fibrosis have shown neither cells nor streptococci in the milk.

TABLE V  
RELATION OF STREPTOCOCCI TO THE NUMBER OF LEUCOCYTES IN MILK FROM  
QUARTERS WITH MARKED FIBROSIS

Number of quarters	More than 500,000 cells per c.c.		Less than 500,000 cells per c.c.	
	Streptococci present	Streptococci absent	Streptococci present	Streptococci absent
117	47	20	6	27

CONCLUSIONS

1. Milk containing more than 500,000 cells per c.c. always indicates an abnormal or pathological condition in the udder.
2. Milk containing large numbers of cells will generally continue to contain excessive numbers while milk with a small number of cells rarely shows more than 200,000 per c.c.
3. Variation in number of cells per c.c. is greater in milk containing large numbers of cells than milk showing a smaller number.
4. Alkaline reaction to brom thymol blue is never obtained on freshly drawn milk from a fibrosis free quarter.
5. When streptococci are found in aseptically drawn milk, the quarter is always indurated.
6. All quarters free from scar or indurated tissues never show demonstrable streptococci or cells in excess of 150,000 per c.c. in the milk.
7. Not all indurated quarters show streptococci or a significant number of cells.
8. Milk from a normal quarter or free of fibrosis does not contain long chained streptococci or cells in excess of 150,000 per c.c.

BIBLIOGRAPHY

- Breed, R. S. Cells in milk derived from the udder. *New York State Agri. Exper. Sta. Bull.*, 380:61, 1914.
- Hucker, G. J., Trudell, F., and Jennings, William. Detection of sub-clinical mastitis. *New York State Agri. Exper. Station, Tech. Bull. No. 199*, 1932.
- Udall, D. H., Johnson, S. D. Diagnosis and control of mastitis. *Cornell Vet.*, 21:190-206, 1930.

## Meals for School Children—Yugoslavia

THE central committee of the Junior Red Cross of Yugoslavia has been active in establishing lunch rooms for school children, particularly in the villages where children live at long distances from school and do not receive sufficient food for lunch. Part of the necessary funds is provided by central and local committees of the Junior Red Cross on the condition that its members actively participate in the work of the lunch rooms and that they cultivate their own vegetable gardens, the products of which are used for the lunch rooms. Subsidies are also granted by the local government and by private relief agencies. A recent law on primary schools orders the establishment of lunch rooms in all village schools.—*Nouvelles de l'Union Internationale de Secours aux Enfants*, Geneva, Sept., 1932.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*  
AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMAN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## YOUR ASSOCIATION

EVER since the organization meeting held at the New York Hotel on Friday evening, April 18, 1872, the American Public Health Association has played a leading part in molding the health organizations of our continent. The Annual Meetings have served for the contribution of reports and papers upon important sanitary questions, most of which are later published in the columns of this JOURNAL. This abundant harvest, rich in the researches and studies of our numerous committees and individual members, has furnished food to many a hungry sanitarian seeking the views of those of wider experience.

Health departments throughout the land are reporting new low death rates for 1932. Many are puzzled at these new low figures. Few of us stop to appreciate what an important contribution our Association is making by creating safeguards of human life which make possible these new health records. Undoubtedly many reasons will be given for the continued salubrious health conditions of 1932. Foremost among these causes stands forth the fact that we are still reaping the benefit of the health promotion activities which have been built up during the past two decades. Public health reflects collectively the health consciousness of the individual citizen. A community with a low diphtheria death rate is one in which the average mother has learned that every child beyond the age of 6 months should receive diphtheria protection. The absence of smallpox results from generous vaccination and revaccination. A low tuberculosis death rate means that the public has learned that this is a communicable disease and that tuberculosis comes from tuberculosis. Case-finding machinery, periodic health examinations, clinics, open air schools, hospitals and sanatoria have made their contribution, but health education is the foundation stone on which have been created community health facilities. The apparent increase in malnutrition reported from many sources offers a challenge to the health officer to fight strenuously for the maintenance of his organization. The progress of the past



and the hope for the future is in no small manner dependent upon our success in coherently maintaining our support and interest in the American Public Health Association.

Naturally, there are other factors which have contributed to the maintenance of good health. Nature has blessed us with relative freedom from such epidemic diseases as influenza, concerning the control of which we know so little. Progress in science and the development of new administrative and control procedures have been encouraged and furthered by the members and committees of this Association. There has never been a time in its history when the American Public Health Association was more deserving of the support of its membership. In spite of adverse circumstances the number of active members in 1932 showed little reduction over previous years. There is great need for concerted effort on the part of all of us to stimulate and maintain the whole-hearted support and interest of the health workers throughout the country. Do your share to stimulate this interest. Pay your own dues promptly and see that your neighbor does likewise. Constitute yourself a committee of one to secure a new member. The American Public Health Association means much to its individual members but to the children of our country and the future health of our nation it means even more.

## THE DEPRESSION AND HEALTH

IN our October issue we gave our readers the Presidential address delivered at our meeting in Washington. It was optimistic from practically every standpoint. Reports from 82 of our large cities as well as from the country in general showed a decline in both morbidity and mortality, which was practically continuous. Industrial life insurance companies also report low mortality rates among their policy holders. Even tuberculosis and pneumonia showed a marked decrease over the previous year. There was a marked absence of epidemic diseases. Since that time, influenza has become epidemic throughout a large part of the United States, but the type is mild, with a few complications and very little pneumonia, so that the influence on the death rate has not been marked.

All health workers have, however, been fearful of the consequences of malnutrition in children, and our President, in spite of his optimistic outlook, warned us that if present conditions should continue, there was a practical certainty that bad results would soon be in evidence, owing to lack of food of proper quality and quantity. With few exceptions, reports have continued to be good. Certainly all of us have been agreeably surprised by the good conditions which have persisted, but it is to be hoped that no one has lulled into a false sense of security. With something like 12 million people unemployed in our country, and 40 million or more feeling the pinch due to this, it is beyond belief that favorable conditions can continue, even if we are blessed with the good weather and mild winters which have characterized the past few years. Indeed, already there are some who state unequivocally that the effects of malnutrition are becoming evident. The recent hearings in Washington were heart-rending, particularly the statements made by responsible people in regard to the miners in the coal regions. In cities throughout the United States, the budgets for relief are falling far below the estimates and the needs. From the highest authorities, such as the Red Cross, we learn that in certain sections at least, relief is only 20 per cent of what it should be. In spite of the wheat and cotton distributed through the Red Cross,

many people are still in desperate want, and conditions are getting worse as supplies become exhausted.

The Health Organization of the League of Nations has made what is practically a world-wide study of the situation. The figures in question are necessarily old, but as we have already said, conditions are almost everywhere becoming worse rather than better. The estimate at the end of 1931 was that there were between 20 and 25 million unemployed in the world, and that between 50 and 60 million were directly or indirectly affected. The United States headed the list of unemployed, with Germany second.

This review accounts for the low death rate in children by the well known fact that in periods of economic depression, marriages and births fall, but recognizes that the decline was not sufficient to account for the lowered general mortality, or the lowered infant mortality. Even among growing children from 1 to 15, who are naturally affected by food restrictions, the death rate continued to fall.

One naturally turns to tuberculosis in a study of this sort, since it is well known that food restrictions lessen resistance and favor infection. During the World War we had a striking demonstration of this fact, since the increase in tuberculosis was greatest where food restrictions were most severe, yet here again, we get a favorable report. In certain towns the decrease reached record figures, and this is true for the United States in general. Certainly the unfavorable effects of our depression have not yet become marked, judging from available records, but these are not up to date, and later returns may alter the picture.

The physical effects are not the only damage caused by the depression. There is a profound psychological disturbance among the unemployed, and this seems to be particularly severe on adolescents. In this country we have an army of boys, estimated at 200,000 by no less authority than General Glassford, who are tramping the country. These boys have been crowded out owing to the fact that many homes are now housing 2 to 3 families. They are of the adventurous and spirited type, indeed the best of their class, and unless something can be done for their relief and organization, there is reason to fear permanent injury to their characters. In some countries, clubs for the young unemployed have been created. Practically all countries studied recognize the gravity of the situation, and are intent on devising ways and means for providing for these youths useful work, which will not only furnish food and good surroundings, but will relieve the mental stress which forms so grave a feature. In this country, the matter is being considered by our federal authorities as well as by the individual states, but no comprehensive solution has yet been found.

Everyone concerned has wondered why the depression has not brought physical and mental conditions worse than we find them. The answer is not entirely easy. Doubtless our health organizations, city, state, federal, and private, have sowed good seed in the past, and we are now reaping some of the rewards of their good work and organization. A succession of mild winters and the absence of severe epidemics have also helped, but when all is said and done—the answer is not to be found in any single feature yet mentioned.

## LETTER FROM GREAT BRITAIN

### VIEWS ON ECONOMY REPORTS

IN the family circle the member who preaches economy is usually the least popular. Nationally also the position would appear to be the same; judging at least from some of the opinions expressed with regard to the reports of the two chief bodies who undertook to inquire into the position here and show the way to savings.

The first body to take the matter up consisted of a number of members of Parliament and was more or less self-constituted. When its report appeared, pandemonium broke loose and bore away with it, into oblivion apparently, not only the report but the chairman also.

The second body, speaking generally, seems to have fared rather better. Largely this is because it was a special committee set up at the instance of the Chancellor of the Exchequer to investigate local expenditure, and its report was official and presented by command to Parliament. In spite of this, it has not been too well received by local authorities in general, or by organizations or associations connected with or concerned in local government. In especial, very strong objection has been raised to suggestions that appear to involve interference with public health activities, not only by health officers but by members of municipalities and social organizations.

The report itself, for the reason that in some respects it does not appear to be too well informed, offers opportunities for criticism, and these it may be taken have not been neglected. One of the strongest protests against it has come from the British Institute of Social Service, a voluntary body of importance and standing. The protest is in the form of a manifesto, the signatories in-

cluding well known industrialists, educationalists, authors, publicists, and economists, among them Sir William Morris, of motor car fame, Sir Josiah Stamp, Sir Thomas Horder, the physician, recently created a peer by the King, Sir Oliver Lodge, Mr. John Buchan and Mr. H. G. Wells. The main appeal made is against any serious retrogression from the standards so laboriously erected by the local government system of the country.

Attention further is drawn specifically to the danger inherent in any attack upon the character of the local government service. In connection with this there is a fine tribute to those who work in an official capacity which it is hoped may be understood and appreciated by the public which "too little realizes the debt it owes to the great army of anonymous officials, so loyal, so devoted, so expert, so incorruptible, upon whose work the maintenance in being of the great society very largely depends."

### DISAPPEARING SALARY CUTS

EVEN if there were indications of improvement this would be a difficult time of the year at which to recognize them. Nevertheless, in relation to the public health and local government service generally there have been certain happenings that may be regarded as suggesting that among members of local authorities in parts of the country the outlook appears brighter.

Included among these occurrences are the more or less complete cessation of talk about salary cuts, with hints as to the removal or modification of cuts already made. In some cases, indeed, cuts actually have been removed wholly or in part, and though the instances in

fact are few, very great value is attached to them because of the fact that they create a precedent and give others something upon which to base an appeal. That they will be so used increasingly as time goes on may be taken, and though nothing resembling a stampede is likely to occur, there will be a tendency on the part of a number of authorities to follow the example set by what may be regarded as more kindly and progressive councils.

The last time I made reference to the matter of salary cuts, I imagine I stated that largely it was a case of fifty-fifty, half the local authorities having imposed a cut graduated up to an average maximum of 10 per cent. Since then the figures have varied very little, the recent happenings referred to above giving rise to the hope that an end has been made of cutting and that the percentage of cut-free areas will steadily increase.

#### HOSPITAL ACCOMMODATION IN LONDON

FROM the medical point of view, one of the great changes made by the Local Government Act of 1929, which so very profoundly affected administration in this country, was in relation to hospital accommodation. Institutions which, up to the time the law altered, were part of the poor law provision, passed into the hands of the bodies responsible for local government generally, including public health. This change already even, it would seem, has led to improvements in this regard, and has been greatly to the advantage of the people. In London the effects of the alteration have been particularly marked, and though it has involved a vast amount of reorganization and labor, has caused comparatively little disturbance.

Reporting recently to the London County Council, Sir Frederick Menzies, the Medical Officer of Health, gave a very full and complete description of

the processes involved in the change over and of the position so far as municipal hospitals are concerned.

The hospital branch of the hospitals and general medical services of the county council is divided into two main sections, one dealing with general and the other with special hospitals. The work of the first-named embraces the management of some 44 hospitals and institutions, containing round about 28,000 beds. The special hospitals division deals with the management of 31 hospitals; of which 17 are for infectious diseases. The beds number about 13,500. In addition to these institutions there are, of course, the voluntary hospitals—general and special—which do not concern the county council, but which greatly increase the number of beds available for the treatment of the sick of the metropolis.

Among the general hospitals there are such institutions as St. Bartholomew's, the Middlesex, Guy's, and so on, all of them very old, established, and historically interesting. Each of them is a medical school within the University of London, the staffs being concerned in teaching and preparing the students for qualifications granted by the University of London and other universities and recognized examining bodies.

So far as teaching is concerned, it is interesting to learn from Sir Frederick Menzies's report that provision is to be made for making use of the very valuable material in the hospitals for which the county council is responsible in a manner and to an extent never attempted while the institutions were in the charge of the poor law authorities. Included in the medical staffs of the hospitals are numbers of specialists of various kinds who give part-time service as consultants or otherwise. Recently these individuals have received notice of intention to determine their appointment, a move which is regarded as more or less of a formality though it may

indicate that reorganization is intended. That it may have some connection with the extension of the use of the institutions for purposes of instruction of medical students and the placing of members of the staffs of the teaching hospitals upon those of the municipal hospitals is just possible. Even if such a change were made it would make little difference in the quality of the work done in these institutions, which, as the report of Sir Frederick Menzies shows, has attained a very high level.

HONORARY FELLOWS OF THE  
ROYAL SANITARY INSTITUTE

THE Honorary Fellows of the Royal Sanitary Institute of Great Britain elected in December, 1932, I note, numbered two, both being citizens of the United States of America. That one should be Professor Mazýck P. Ravenel is a matter that affords great gratification, not only to me personally but to members of the public health service in this country generally, partly on account of his contributions to *Public Health*, the official organ of our

Society of Medical Officers of Health.

The Royal Sanitary Institute is a distinct body from the last-named Society, and in its composition resembles somewhat the American Public Health Association. In addition to including individuals officially engaged in the various branches of public health and preventive medical work as medical officers and engineers, etc., the Institute is prepared to admit as fellows, members, or associates, others who hold qualifications or are engaged in public or professional work of a recognized and appropriate type.

So far as medical officers of health are concerned, the Institute as a body is held in very high esteem, and in its fellowship are to be found the majority of the more active members in the field of public health.

The other occupant of the list of honorary fellows elected on this occasion is Dr. George A. Soper, of New York City, whose election has been a source of gratification to his engineering colleagues on this side.

London CHARLES PORTER, M.D.

---

## New York City Bulletin

WE regret to note that with the issue of December 31, 1932, the *Weekly Bulletin* of the City of New York Department of Health ceased publication as such. In future, the Bulletin will be issued quarterly, but every effort will be made by the editor to keep up the continuity of the statistical data which have been presented in the past.

The *Weekly Bulletin* has existed in its present form since 1913, though, beginning in 1890, it was the outgrowth of a weekly summary of vital statistics published for the health officers and

registrars of vital statistics. The discontinuance at this time is due to the rulings of the federal postal authorities. The expense has been a burden to the department which was felt to be unjust and unwise. If this law can be changed and second class mailing privileges granted, it is hoped that the *Bulletin* may resume publication weekly.

All who have received this *Bulletin* heretofore will miss it from their desks. It was always well edited, good reading, and full of useful information. We hope that it will soon be revived.

# ASSOCIATION NEWS

## RURAL HEALTH APPRAISALS

The Second Edition of the *Appraisal Form for Rural Health Work* published in January, 1932, is being unusually well accepted and is widely used. A number of state health departments are applying it to all their county health departments.

Those interested in the appraisal of rural health work will be gratified to know that Dr. E. L. Bishop's sub-Committee on Rural Health Work has taken cognizance of the fact that special health problems exist more frequently in rural than in urban areas, through the appointment of a special sub-committee to consider appraisals of

activities designed to meet such special rural problems. This sub-committee, composed of Sophie C. Nelson, R.N. *Chairman*, Dr. Allen W. Freeman, and Dr. W. S. Leathers, is studying the problem and considering the possibility of preparing a supplement to the Rural Appraisal Form which would include definitions of the more important special problems (as a means of determining whether or not such items should be included in the appraisal of any given area) and the scoring of programs designed to meet such problems. It seems probable that malaria, hookworm, and trachoma will be the first three special problems to be considered.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### Health Officers Section

Paul H. Brown, M.D., 265 Main St., East Haven, Conn., Health Officer  
Dr. Emily F. B. Chatfield, Voluntown, Conn., Health Officer  
Edward J. Howland, M.D., 25 S. Main St., Colchester, Conn., Health Officer  
William W. McFarland, M.D., 620 City-County Bldg., Pittsburgh, Pa., Director, Department of Public Health  
Abbott B. Mitchell, M.D., Court House, Allegan, Mich., Director, County Health Unit  
John H. Mountain, M.D., D.D.S., 172 Washington St., Middletown, Conn., Health Officer  
H. R. H. Nicholas, 33 Ivy Lane, Englewood, N. J., Health Officer  
Paul M. Spurney, M.D., City Hall, Shaker Heights, O., Health Commissioner  
Dr. Cecil J. Vaughn, Lexington, Miss., County Health Officer

### Vital Statistics Section

Harry W. Gehm, M.S., 531 Walnut St., Elizabeth, N. J., Statistician

### Laboratory Section

George J. Hucker, Ph.D., New York State Agr. Exp. Station, Geneva, N. Y., Chief, Bacteriological Research  
Israel Weinstein, M.D., Ph.D., Sc.D., 1165 Park Ave., New York, N. Y., Teacher of Bacteriology and Hygiene  
Doris E. Wilson, B.S., 403 Second St., Jackson, Mich., City Bacteriologist

### Public Health Engineering Section

Lyman B. Chamberlain, A.B., Barry County Health Dept., Hastings, Mich., Sanitary Officer  
Bernhard P. Domogalla, Ph.D., 803 State St., Madison, Wis., City Biological Chemist  
Bernard J. McMorrow, B.S., 113 Chandler St., Boston, Mass. (Assoc.)  
John A. Scarlett, Allegan, Mich., Sanitary Inspector  
Wilmer H. Schulze, Ph.D., 503 Rock Glen Rd., Baltimore, Md., Chief, Division of Chemical Technology, Department of Health

*Food and Nutrition Section*

Christine Hall, R.N., 69 Paradise Rd., Northampton, Mass., Supt., Smith College Infirmary

Gilbert H. Hood, Jr., 500 Rutherford Ave., Charlestown, Mass., Secretary, H. P. Hood & Sons, Dairy Experts

*Child Hygiene Section*

Dorothy L. Campbell, R.N., 112 Brighton St., Plainwell, Mich., Health Teacher

Gertrude B. Hansen, Box 133, Houghton, Mich., County Nurse, Children's Fund of Michigan

Leone V. Hartlein, R.N., Hastings, Mich., Health Teacher

Helen Linn, R.N., 428 S. Broadway, Hastings, Mich., Health Teacher

Margaret M. Nicholson, M.D., 1801 Eye St. N.W., Washington, D. C., Child Hygienist

Mildred L. Tuttle, R.N., 119 W. Green St., Hastings, Mich., Instructor, Health Education

Marion Wetzel, R.N., Kellogg Club House, Augusta, Mich., Health Teacher

*Public Health Education Section*

Maria W. Bates, B.S., 410 Stuart St., Boston, Mass., Student (Assoc.)

May E. Chinn, M.D., 44 Edgecombe Ave., New York, N. Y., Student (Assoc.)

Frank K. Fairchild, 86 Lefferts Pl., Brooklyn, N. Y. (Assoc.)

G. Hamilton Francis, M.D., 1024 E. Liberty St., Norfolk, Va., Promotion of Public Health, National Medical Association

Jethra Hancock, M.D., 532 W. Main St., Louisville, Ky., Director, Bur. of Venereal Disease, State Board of Health

Mrs. Joseph Sanders, 2612 Tilden St., Washington, D. C., Chairman, District of Columbia Health Congress of Parents and Teachers

*Public Health Nursing Section*

Jean MacD. Clark, R.N., 246 Monroe St., Allegan, Mich., County Nurse, Allegan County Health Unit

Sister M. Laurentine Harrington, R.N., St. Francis Hospital, Pittsburgh, Pa., Principal, School of Nursing

Ann Morton, R.N., Weyburn, Sask., Canada, School Nurse

Susan Smith Nobles, R.N., 422 W. Green St., Hastings, Mich., County Nurse

Lena M. Schermann, R.N., 636 Marshall St., Allegan, Mich., Allegan County Nurse

Rena D. Wing, R.N., Health Unit, Hastings, Mich., County Nurse

*Industrial Hygiene Section*

Lewis A. DeBlois, 15 West 11 St., New York, N. Y., Consulting Engineer on Occupational Disease Prevention

## DR. BOLT RECEIVES OBERLAENDER AWARD



RICHARD A. BOLT, M.D., F.A.P.H.A.

Dr. Richard A. Bolt, M.D., F.A.P.H.A., Director of the Cleveland Child Hygiene Association and Editor of the Child Hygiene Notes Section in the *Journal*, has been granted the Oberlaender Trust Award "to carry on a detailed study of Maternal and Child Welfare Conditions in Germany and Austria."

"The Oberlaender Trust was founded under the auspices of the Carl Schurz Memorial Foundation, Inc., by Gustav Oberlaender, Reading, Pa., as an expression of his desire to be of greater service to the American people. The trust is for the specific purpose of furthering a better understanding of the German-speaking peoples by the American people and *vice versa*." Dr. Bolt will leave Cleveland early in April.

# PUBLIC HEALTH ADMINISTRATION

India—In 1921 public health work in India was transferred with certain reservations from the Central Government of India to the governments of the various provinces. A ministry of health was not provided for in this change and no such central organization exists. The activities of the Central Government are maintained by the Department of Education, Health and Lands. In transferring these health activities to the provinces certain functions were reserved for the Central Government. These include international health affairs, epidemiology, census and statistics, emigration and immigration, pilgrim traffic, major port quarantine work, and medical research. In 1929 the birth rate in British India was 34.8 per 1,000; the death rate was 24.9, and the infant mortality rate was 178.4 per 1,000 births. The death rate of 25.9 may be compared with that of England and Wales of 13.4; for the United States, 11.9; for Austria, 9.6; and New Zealand, 8.8.

Kala-azar has been prevalent in the Eastern provinces of India. It was imported into Assam in 1882 and has slowly spread. At first the mortality rate was high, 90 per cent of the cases dying, but treatment with antimony has resulted in a 90 per cent recovery rate. Cholera in 1929 was the cause of 295,434 deaths in British India. The rôle of pilgrimages in the spread of this disease is well known and attempts at mass inoculation on a voluntary basis are being made in connection with these fairs.

There were 72,482 deaths from plague in British India in 1929, a mortality less than that for 1928 but more than in 1927. Reviewing the mortality for a number of years there is evidence that

plague is progressively decreasing. One theory advanced is that there has been evolved a race of rats immune to plague. An inquiry is being made into the immunity of wild rats in different parts of India. Other causes ascribed to the gradual disappearance of plague are: (a) the exercise of a natural and common law which, as in other zymotic diseases, determine the rise and fall of epidemic conditions; (b) protection by inoculation, by sanitary measures such as deratization, rat proofing, etc.; (c) some influences acting in the flea factor.

There were 72,884 deaths from smallpox, the mortality among children under 10 years of age being 58 per cent of the total smallpox mortality. There were performed 9,579,806 primary vaccinations and 6,339,632 revaccinations. India still retains the unenviable reputation of being the greatest center of smallpox in the world.

This report from the hand of Major-General J. D. Graham, Public Health Commissioner for the Government of India, is replete with valuable tables, charts, and diagrams. There are nearly 500 pages of detailed information pertaining to the health of the Central Government and to the various provinces of India.—*Annual Report of the Public Health Commissioner with the Government of India for 1929.*

Attleboro, Mass.—In the 1931 health department report for this city of 21,982, attention is directed to popular health education.

A properly organized health department finds its duties more and more concerned with much needed education in public health. As the laws of health and hygiene are better understood, the control of disease becomes a simpler and more effective procedure. When



health education is extended to arouse an increasing interest in health, a public demand will be created for better health standards.

The program included the publication and distribution of literature and reports, as well as newspaper publicity through articles and paid advertisements. A thorough house-to-house canvass of the whole city was conducted as a part of the diphtheria prevention program. Incidentally, there were 8 cases of diphtheria, with no deaths, only 1 death from this disease having occurred in 4 years. Several extra nurses were employed to give first hand information and advice by direct talks with parents in their homes. The health camp furnished daily instruction to 40 boys, who not only learn but live health habits during the camp season. The teaching of these boys was continued through the winter in special weekly class meetings at the Y.M.C.A.

**Montreal, Quebec** — Scholarships were granted by the city administrators in 1931 to two physicians of the Department of Health in order that they might complete their studies in public health at Johns Hopkins. Appointment was made by the city executive committee on the recommendation of the Department of Health Director. In the terms of the grant of \$1,200 to each physician, the appointed physicians are to remain in the city's employment for a period of 5 years, and their leave of absence was granted with salary for the duration of the course. "Such special training of members of the staff will contribute greatly in maintaining the Department of Health of the city on a high standard."

During the convention of the American Public Health Association, held in Montreal in 1931, the foundation of a Public Health Institute in the Province of Quebec was suggested. The proposed plan, with a draft of organization, is published in the annual report of the

department of health in order to explain and stimulate interest in this program for the education and training of public health officers.

In 1931, a campaign of propaganda was inaugurated in an effort to teach mothers the value of breast feeding. Lectures to physicians and nurses of the child hygiene division of the department, and an illustrated poster "mother feed your baby yourself" with a distribution of 25,000 copies, were among the features. Both the poster and publications were distributed through the medium of baby clinics. Immunization against diphtheria was continued, 10,056 children having received three preventive treatments.

**Bernalillo County, N. M.**—While no cases of typhoid were traced to infected water, milk, or other food, a large number were secondary, developing in homes where inadequate attention was paid to personal hygiene and disinfection of body discharges, according to the 1931 County Health Department report. Multiple cases included in one instance 7 different members of the family who contracted the disease from the original patient.

Tuberculosis cases and deaths decreased considerably in 1930 and 1931, "perhaps due to the fact that economic conditions militated against the individual with tuberculosis migrating to the Southwest in search of climatic advantages."

The budget of \$15,852 gives a per capita expenditure of \$.326 for the year by the County Health Department. There were 107 lectures given with an attendance of 8,417; 1,614 bulletins and 645 circular letters were distributed; 345 newspaper articles on health were printed; and 5 health exhibits were prepared. One of the commendable features of this report is a 2-page statistical summary of 22 major activities, which effectively picture the scope

of services and will be useful for comparative purposes another year as well as for comparison with the work of other departments.

Brantford, Ontario—The annual report of the health officer for 1932 records the use of toxoid for 10 years during which time 10,892 children have been treated. The last case of diphtheria was reported in 1930. An average tuberculosis mortality rate of 22.9 for 3 years is noteworthy. This is less than one-third of the Dominion rate and less than one-half of the rate for the Province. In stressing the importance of health education in fighting tuberculosis, the Deputy Minister of Health is quoted as saying, "Health education is one thing which is extremely important in promoting and stimulating public interest in wiping out tuberculosis." He urged volunteer health organizations to "Spread the gospel of health, draw public attention to articles written on this subject, bring the matter to the people who are governing us, and work on them until they do something about it."

United States Public Health Service—The Surgeon General's report for the fiscal year 1932 notes that "The increasing use of international aerial transportation makes it of special importance that current information relating to the prevalence of disease in foreign countries be available." Cholera was not reported outside of Asia and the adjacent islands. In the Philippine Islands there were 936 cases reported as compared with 4,600 in the previous year. All of the grand subdivisions of the world except Australia reported plague in 1931. In North America no case of human plague was reported. Yellow fever exists in endemic form in extensive regions in Africa and South America. International health agencies recorded 160,000 cases of smallpox,

with 33,000 deaths, as compared with 315,000 cases and 65,000 deaths, the previous year.

The general health of the people of the United States as reflected by mortality rates was maintained at a high level during the past  $2\frac{1}{2}$  years.

. . . It is quite probable that the present remarkably good health conditions are, to some extent, the direct result of efforts on the part of health agencies, which have, no doubt, retarded the evil effects of unemployment and economic hardships upon health. The fortunate absence of any serious widespread epidemics has also been a factor.

Regular coöperative rural sanitation studies and demonstrations were conducted in 144 projects in 28 states. The annual survey by the Service showed that on January 1, 1932, there were 616 counties in the United States operating permanent local health service under the direction of a full-time medical health officer, an increase of 59 over the number recorded the previous year.

This comprehensive report deals with the measures carried out for the prevention of the introduction of diseases from abroad, the medical examination of aliens, the prevention of the spread of diseases in interstate commerce, and important investigations of public health problems, including cancer, heart disease, leprosy, mosquito control, pellagra, and many other conditions.

Providence, R. I.—In the 1931 annual report of the Providence Superintendent of Health, attention is properly directed to the 48 years of continuous service, as superintendent, of Dr. Charles V. Chapin, Dean of health officers, who recently retired from this office.

. . . Dr. Chapin is not only a student but also a clear practical thinker, which qualities brought him widespread distinction. Under his leadership, the health department of this city was not merely efficient but a step or two ahead of other cities. The work of the de-

partment has been centered on the things which are most necessary and worth while.

During 1931, there were 1,137 prenatal letters distributed. Six nurses supervise the children delivered by midwives until they are 5 years old, making 14 calls on each well baby before it is 1 year of age, monthly calls during the second year, and 4 calls a year thereafter. One nurse supervises the infants and young children in licensed boarding homes, and the infants of such unmarried mothers as are not under the nursing supervision of private agencies. One nurse from the department makes 1 visit upon each infant delivered by a physician, provided the mother is not on the maternity service of the district nursing association or a ward patient at the Lying-In hospital. Coöperating with the State Children's Bureau, this nurse also visits periodically the licensed maternity homes and some of the day nurseries in Providence. The infant mortality rate was 57.5 for the year.

The school dentist examined the pupils of the second and third grades of 20 parochial and special schools. Of the 2,003 pupils, 1,559 had carious teeth or some other dental defect. Children found in need of treatment by school dentists, physicians, or nurses were referred to their family dentists, but if parents were unable to pay a private dentist, the children were referred to one of 3 hospital or special clinics, or if below the fourth grade, to one of nine public school dental clinics for treatment. The Exchange Club continued to provide dental treatment at home to persons ranging in age from 3 to 21 years who were so physically or mentally handicapped that they could not attend a dental clinic.

**Public Health Organization in Indiana**—The first regular meeting of the Indiana State Board of Health was

held January 18, 1882. The total appropriation for the first biennial period was \$5,000 per annum. This year the Indiana State Board of Health is celebrating its 50th birthday.

Few health organizations can boast of only 5 administrators over a period of 50 years—an average of 10 years per administrator. This speaks highly for the efficiency of the Indiana organization and its removal from political intrigue. As a matter of fact the State Board of Health has had practically only 3 administrations as the first 2 health officers served but a few months each. Dr. Metcalf served as Secretary from 1884 to 1896. Dr. Hurty, that great pioneer of health promotion, a former President of the American Public Health Association (1912), served from 1896 to 1922, and his successor, Dr. King, is still in command.

At first the State Board of Health devoted its energy to the establishment of local boards of health in counties, cities, and towns throughout the state. A state quarantine law was enacted in 1903 and the laboratory established in 1905. A model housing law was passed in 1912. The present State Health Department is organized with the following divisions: Executive, Vital Statistics, Chemistry (including milk and food), Communicable Disease (including venereal disease), Infant and Maternal Hygiene, Public Health Nursing, Housing and Industrial Hygiene, and Laboratory of Bacteriology. In 1931 the annual appropriation was \$275,000. There are 108 employees, all of whom are full-time except the medical directors in charge of 14 venereal disease clinics.

The first white settlement in Indiana was that of Vincennes and it was here that pioneer efforts were made to improve the health of its citizens. The first health ordinance in Indiana was passed in Vincennes in 1819 prohibiting the creation of nuisances which were

against the public comfort and welfare. It dealt largely with garbage and other offensive matter. The town constable was empowered to remove or cause to be removed all nuisances from the street and penalties could be invoked. This town was visited by an epidemic of yellow fever in 1820. In 1832 Asiatic cholera raised havoc in many communities and other health boards were appointed, especially that at Madison.

It is stated that the first native of what is now Indiana to be vaccinated against smallpox was Little Turtle, a famous Miami Indian Chief. The story goes that he was vaccinated at the time of a visit to Washington where he went to confer with the great White Father.

The first health board in Indianapolis was established in 1850. A public water supply system was constructed in Madison as early as 1816. This bulletin is filled with valuable historical facts concerning the early development of public health administration in Indiana. —*Month. Bull.*, Indiana State Board of Health, Nov., 1932.

**U. S. Children's Bureau**—During the fiscal year ended June 30, 1932, short, intensive courses in obstetrics (on request of state departments of health and county medical societies) for doctors in active practice, carried on for 2 years through the coöperation of the medical school of Emory University in Atlanta, Ga., were extended to rural communities in Kentucky and Mississippi. Courses are scheduled for New Hampshire.

A special investigation was carried out in New Haven of the value of salmon oil in the treatment of infantile rickets.

If the quantity of salmon oil potentially available in the salmon canning industry were to be put on the market as a properly standardized food and supplied at low cost

through the usual channels for distribution of food, one of the great nutritional needs of children would be more easily and more adequately met.

Ten years ago, it is stated, approximately 121,000 children were receiving aid in the 40 states that then had mothers' aid laws. In 1931 reports from 44 states and the District of Columbia show that approximately 250,000 children were receiving this form of assistance in their own homes. The total amount reported as paid to mothers' aid families during 1931 was approximately \$35,000,000. In 82 per cent of these families, the father was dead; in 5 per cent he had deserted the mother; in 2 per cent the parents were divorced; in 3 per cent the father was in prison; in 4 per cent he was physically disabled, and in 3 per cent mentally disabled.

For the last 4 years the recreation specialist of the bureau has given most of her time to furthering programs in rural districts. This work has been done in coöperation with the extension division of federal and state departments of agriculture, and has reached many groups of older boys and girls and women, and a number of mixed groups of men and women. Last year there was an increase in the numbers of adult groups seeking advice and assistance in planning for leisure-time activities and social life for their communities.

The Children's Bureau, among other activities, has been engaged actively during the last 2 years in the development of the current reporting of local social statistics and centralized tabulation and analysis. Such a plan is necessary to provide for information as to significant national and local trends in social and health services in child welfare and related fields.

# LABORATORY

## TITRATION OF THE NEUTRALIZING POTENCY OF ANTI-MENINGOCOCCUS SERUM BY THE PHENOMENON OF LOCAL SKIN REACTIVITY\*

GRACE M. SICKLES

*Division of Laboratories and Research, New York State  
Department of Health, Albany, N. Y.*

A SERIES of tests was undertaken to investigate the possibility of using the measurement of the neutralizing potency by the phenomenon of local skin reactivity<sup>1</sup> as a control upon the method for standardization of anti-meningococcus serum by the agglutination test.

Preliminary tests were carried out by the method of Schwartzman<sup>2</sup> without "auxiliary antibody." The results confirmed the observation of Schwartzman<sup>3</sup> that differences were obtained in the degree of neutralization of filtrates of different strains of meningococci even from the same group.

The sera tested by this method did not appear to be high in neutralizing potency when a serum titrated against a group-III toxic filtrate sent us by Dr. Schwartzman was used for comparison. Clinical reports on lots of serum from two horses from which some of the sera tested were obtained indicated that they were therapeutically effective. Of 30 reports returned on the use of serum from one horse, 25 were of recoveries; of 14 on the use of serum from the other horse, all were of recoveries.

In an attempt to obtain serum of high neutralizing titer, immunization of horses with toxic filtrate together with live culture was undertaken. At the

same time because of the expense involved and in an attempt to control some of the variables in the Schwartzman test, another method of titration was used. Neutralization of various dilutions of a broth-filtrate toxin by the serum to be tested in a series of intradermal injections on the depilated backs of large rabbits was compared with neutralization of the same dilutions of toxin by normal horse serum and by other sera on the same animal. The intravenous injection given 18 hours later was 0.2 per cent agar.<sup>4</sup>

With this technic, differences in neutralization, such as are observed in the simple intracutaneous tests with streptococcus toxin and serum, were also revealed with the meningococcus toxin and serum; and the necessity for reliable standards of comparison before the test will be of value as a method of standardization was clearly indicated. For the present, however, it is of value in permitting direct comparison of the test serum with other sera on the same animal.

When tested by this technic, the method of immunization with live culture intravenously, together with toxic filtrate subcutaneously, apparently produced serum of higher neutralizing titer in one horse than was usually obtained with the routine method of injection with live culture intravenously only. The serum of another animal under immunization by the latter

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

method, however, was just as high in neutralizing potency.

Clinical reports on the therapeutic value of sera from these horses are not as yet available.

#### CONCLUSIONS

Titration of the neutralizing potency of antimeningococcus serum by the phenomenon of local skin reactivity is possible within certain limits.

The significance of the test as an indication of therapeutic value has not yet been established but the simpler technic, although not sufficiently developed to be used as a method of

standardization, provides a means for comparison and evaluation and supplies information not obtained with the agglutination test.

#### REFERENCES

1. Schwartzman, Gregory. A new phenomenon of local skin reactivity to *B. typhosus* culture filtrate. *Proc. Soc. Exper. Biol. & Med.*, 25:560, 1928.
2. Schwartzman, Gregory. Therapeutic antimeningococcus serums. Their neutralizing potency as measured by the phenomenon of local skin reactivity. *J. Infect. Dis.*, 48:339, 1931.
3. Schwartzman, Gregory. Variations in neutralizability of meningococcus toxins, as measured by the phenomenon of local skin reactivity. *J. Bact.*, 23: 95, 1932.
4. Sickles, G. M. Local skin reactions obtained by intravenous injection of agar following intracutaneous inoculation of meningococcus toxin. *J. Immunol.*, 20: 169, 1931.

## SOME VARIANTS OF *BACILLUS MEGATHERIUM*\*

GEORGES KNAYSI, PH.D.

Department of Dairy Industry, Cornell University, Ithaca, N. Y.

THE variation of *Bacillus megatherium* has been studied in meat infusion broth at pH 6, 7, and 7.8, with and without the addition of lithium chloride. A large number of variants were obtained under different conditions. Some of the most interesting variants came from the alkaline broth. One of these was a pigment forming strain growing in deep yellow colonies. Another was a very heavily capsulated strain in colonies which flow if the Petri dish is tipped at an angle. A third variety gave a thin, translucent colony containing, even before it was 24 hours old, over 30 per cent of shadow cells. A fourth strain, with a similar translucent colony when young, showed an excessive formation of buds at the tip of the cells, where as many as four spherical buds in a chain, reminding one of mold conidia, were observed.

Formation of buds along the side of the cell was less frequent. Sometimes a bud at the tip of a cell would be elliptical with the long axis perpendicular to the long axis of the cell. Such buds were isolated in micro-droplets and found to grow into rods which multiplied. Many of the spherical buds and the elliptical ones were very actively motile and showed flagella similar to those of the cell from which they originated. This strain was non-capsulated and no spores were seen in hundreds of cultures in micro-droplets, where normal strains sporulated very profusely. Aside from budding, this strain formed, even in young colonies, an unusual number of peculiar cell forms similar to what has been described in the literature as arthrospores, microcysts, etc. Many of these peculiar forms were actively motile.

Other interesting variants have been isolated, but have not yet been studied in detail.

All of these variants can be kept

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.

stable by frequent plating, and all of them tend to change in old colonies and old liquid cultures.

The colonies of *Bacillus megatherium* show regular cyclic changes, common to the parent culture and to all of the variants. These cyclic changes consist in the formation of concentric translucent and opaque zones. Depending on the variant, the center of the colony may be opaque or translucent. The translucent rings contain mainly shadow cells, some spores, and other forms. The opaque rings are made up of cells of normal appearance and cytology.

In about 3 days or more secondary growth can be seen in the form of opaque pimples over the area of the whole colony and sometimes as outer rings or extensions of various shapes of the margin of the colony. The secondary colonies follow similar transformations to those of the parent colony and may give rise to tertiary colonies. When secondary colonies are cultured, they usually reproduce the parent strain. However, the yellow strain forms white secondary colonies with a yellowish

tinge giving rise on further cultivation to colonies of the same color and to the yellow colonies of the parent strain. Sometimes the secondary growth is too dense and continuous, and pimple-like colonies appear after a long incubation. This probably represents a tertiary growth.

When the colony becomes very old, the primary growth almost entirely disappears, and the faint area of the colony shows most evidently the small, pimple-like secondaries.

An attempt was made to study the sequence of variants from a given initial type. In some cases a sequence has been demonstrated, while in other cases no regularity has yet been discovered.

A daily transfer of the culture in dissociation experiments has been found to result in the selection of certain types which grow best under the given conditions. Aging of cultures which for a long time gave only the same types when frequently transferred, resulted in the appearance of a variety of other forms.

## VITAL STATISTICS

Vital Statistics for Rhode Island—1932—Preliminary figures on file in the Public Health Commission of Rhode Island, show a birth rate for the state in 1932, of 15.7 per 1,000 population, a marriage rate of 5.7 per 1,000, and a death rate of 11.6.

The filing of late returns for births and marriages will change the birth and marriage rates slightly, but not sufficiently to be of significance. The few deaths that occurred in 1932 too late for filing before the new year will make little if any change in the death rate.

The birth and marriage rates are the lowest recorded in Rhode Island since 1855. In spite of a steady increase in

population amounting to over 55 per cent since 1902, the actual numbers of births (11,061), and marriages (4,048) are the lowest in the past 30 years. While the depression has undoubtedly played a part in the declining marriage rate, which is reflected in the birth rate, the depression has only accelerated a downward trend in marriages and births which has been evident during the past 10 years.

The death rate for 1932, of 11.6 is the second lowest death rate recorded for Rhode Island since 1855. Only for the year 1931, when the death rate was 11.4, was the record better. The increase of two-tenths of a point in the

rate for 1932 over 1931 is due to a slight increase in deaths during November and December as compared with the corresponding months of 1931. During the first 10 months of 1932 the death rate was the same as for the corresponding period of 1931.—Births, Deaths and Marriages Recorded in Rhode Island During 1932. Released January 5, 1933.

### Birth Rates and Fecundity in Italy

—The annual number of births of living children in Italy increased in the 19th century until it reached 1,152,906 in 1887. Thereafter it declined gradually until it was 1,042,090 in 1903. There was a gradual decline to 1,040,000 in 1928, the lowest it has been in normal (non-war) years since 1887. But the decline in other European countries is even greater. The deaths in Italy reached a maximum of 869,992 in 1880, decreasing to 635,788 in 1912, rising to 1,240,425 in 1918, but decreasing to 611,362 in 1927. In 1887 the excess of births over deaths was 323,914, and in 1928 it was about 426,000. In Poland this excess was 427,366, in Germany 404,699, in Spain 216,167, in Great Britain 200,405, in France 65,042 in 1927. In 1927 Italian fecundity was 30 per cent inferior to the level of 1866–1875.

The fecundity of legitimate births was 26 per cent lower and that of illegitimate births was 50 per cent lower in the same period of comparison. Illegitimacy has diminished in Italy until it comprises less than 5 per cent of the births. This decline may be due to greater precautionary measures rather than to increased sexual morality. Italy has a legitimate fecundity rate of 214 per 1,000 marriages in the fertility period as compared with the French rate of 139, the English of 133, and the German of 128. In 1926, the Italian birth rate was 27.2, the death rate 16.9, leaving an excess of birth over

death rate of 10.3. The birth rate in various Italian provinces varies between the low British and the high Japanese rate. The death rate varies between the low British and the high Russian. The gain in births over deaths varies between the low French and the high Polish and Japanese rates.—L. L. Bernard—Mortara, Giorgio. *Natalità e urbanesimo in Italia*. I. *Nuova Antologia*. 64, 1374:485–496 (June 16), 1929. *Social Sci. Abstr.* 4:2080–2081 (Dec.), 1932.

**Mortality in the Industrial Population, 1932**—In no previous year has the health record of the industrial populations of the United States and Canada equalled that of 1932. This is clearly indicated by the mortality experienced by the many millions of industrial policy holders of the Metropolitan Life Insurance Company. Their death rate for the year was at the unprecedented figure of 8.34 per 1,000 living, at ages 1 and over—lower by a narrow margin than the previous minimum of 8.37, registered in 1930.

New minima were recorded for 9 important causes of death, namely, typhoid fever, measles, whooping cough, diphtheria, pneumonia, tuberculosis, diarrheal diseases, conditions incidental to pregnancy and childbirth and accidents. Furthermore, among the various types of accidental death, new minima were recorded for accidental burns, machinery accidents, and drownings.

Based on what has happened among these insured wage-earners and their dependents, it is safe to say that the death rate of the general population, in 1932, was also at a new low point. The mortality rate of this large group of insured persons has always proved to be an accurate index of health conditions in the general population—both in the United States and Canada—the mortality statistics for which do not



become available until approximately 1 year after it is possible to publish the figures for the insured group.

The 1911 death rate among Metropolitan industrial policy holders, at ages 1 and over, was 12.5 per 1,000. Had this death rate of 21 years ago prevailed again in 1932, nearly 70,000 more of this insured group would have died than the 139,491 who actually did die during the year. In 1931 alone this net saving amounted to 32,000 lives of policy holders and the accumulated saving since 1911 is over 464,000 lives.

The expectation of life, at birth, among Metropolitan industrial policy holders for the year 1931 was 57.90 years. This may be compared with an expectation of 46.63 years in 1911-1912, a gain of 11.27 years during the two decades. This corresponds to a gain of 24.2 per cent in the average life span of the industrial policy holders. In the general population, in approximately the same period, the gain was only 6.66 years. Thus the improvement among the insured wage earners and their dependents has been almost twice that for the population at large.

It is a matter of great interest that the expectation of life of the industrial population is now within 2 years of that of the general population. Twenty years ago, there was a difference of  $6\frac{1}{2}$  years in favor of the general public. In other words, working men and their families have shown a marked improvement in their vitality. This is due, for the most part, to considerable decreases in the mortality at all of the younger ages of life, because the preventable diseases have been brought, to a marked degree, under control. Few realize the enormous social and economic benefits which these gains have brought about.

The outstanding public health fact of the year was the reduction of the tuberculosis death rate from 76.2 in 1931 to 69.8 in 1932, a new low point. The drop in a single year was 8.6 per cent,

the greatest year-to-year decrease in a decade. The improvement among insured negroes was even greater than for the whites. The tuberculosis death rate has now reached 70 per 100,000. The decline in the mortality from tuberculosis in a single year effected a saving of 1,100 lives in 1932 alone.

The death rate for the 4 principal communicable diseases of childhood has dropped exactly 50 per cent in 4 years, and almost 70 per cent in 10. The death rate for each of these diseases, except scarlet fever, is the lowest ever recorded; and that for scarlet fever is one of the lowest. Even diphtheria, to which the chief interest attaches, has become a minor cause of death. It promises soon to be so entirely out of the picture that no place need be assigned to it in the statistical tables.

The mortality rate for pneumonia dropped in 1932 to a new minimum of 56.8 per 100,000, a decline of 8.5 per cent from the previous low point recorded in 1931. Both white and colored policy holders shared in the improvement.

Despite the country-wide outbreak of influenza in December, the year closed with a mortality rate for influenza of only 17.6 per 100,000, which is well below the average for the last 10 years.

Deaths from conditions arising out of pregnancy and childbirth have shown a practically continuous decline among insured women over a period of 12 years. The puerperal death rate of 1932 (10.6 per 100,000) is about half that recorded for the first few years of the decade beginning with 1920. Nevertheless, crude death rates are misleading as a gauge of developments in the mortality connected with childbirth. The drop is due, in part, to the declining birth rate, whereby women have been exposed less frequently to the hazards of childbirth. The ratio of puerperal deaths per 1,000 live births is a much better measure of what has happened.

But, unfortunately, it is not possible to give this more accurate measure for maternal mortality in this industrial insurance experience. In the general population, where birth data are available, the puerperal death rate per 1,000 live births has shown but little variation from year to year, and is far higher than it need be. It is double the figure which prevails in Denmark and 50 per cent above that in England and Wales. It has been estimated that nearly two-thirds of the deaths which occur could be prevented if expectant mothers received the type of care made available by certain agencies which have concentrated on the care of pregnant women.

Since 1929 there has been a distinct and continuous decline in the alcoholism death rate. In that year it was 3.5 per 100,000; in 1932 it was only 2.4, the lowest figure recorded among Metropolitan industrial policy holders for 10 years. On the other hand, the rate for cirrhosis of the liver, which is often of alcoholic origin, has shown a slowly rising tendency in recent years.

The 1932 mortality record was distinctly unfavorable for 3 diseases, which recorded new maximum death rates. These are cancer, diabetes, and diseases of the heart. A definite upward trend has been manifest for each over a long series of years.

The most disquieting development of 1932 was another sizeable increase in the mortality from cancer. This amounts to 7.8 per cent in a single year, and to 15.8 per cent in 2 years. There has been, for several decades, all over the world, a slow but persistent rise in the cancer death rate; but it is difficult to assign a reason for the sharp acceleration of the last 2 years among insured wage earners. With the exception of diabetes, no increase of equal magnitude has been in evidence for any disease. Whether the population at large has experienced a similar rise cannot be determined at this time. Such

fragmentary data as are available indicate that it has not, although the increase in 2 years appears to have been greater than the average during the last decade. Among the insured, there has been a shift in the relative age distribution whereby a somewhat larger proportion than formerly is now in the higher age ranges where most of the deaths from cancer occur. This alone would bring about an increase in the crude death rate, not only for cancer but for the several "degenerative" diseases. If, however, this had been the sole cause for the rise in the cancer mortality rate, we would have experienced corresponding increases in the rates for cerebral hemorrhage, chronic nephritis, and heart diseases. Such increases have not been observed. The rises in 1932 for cerebral hemorrhage and chronic nephritis were negligible, and that for heart disease amounted to less than 5 per cent in that year, and to only 7 per cent in 2 years. The unprecedented increase in cancer deaths, among the American wage earning population, has attracted attention all over the world. One commentator suggests that it may be related to an increasing hesitancy to call for medical and surgical aid when the patient and his family are without means to pay for it.

Had the much lower cancer death rate of 21 years ago prevailed in 1932, 4,026 fewer Metropolitan industrial policy holders would have died of this disease than the 15,394 who actually died during that year. Had even the rate of 1931 prevailed, 1,117 fewer lives would have been lost.

The previous high point for diabetes was 21.4 per 100,000, in 1931; and the rise, in 1932, was to 23.3, or 8.9 per cent. The increase in only 2 years has amounted to practically 25 per cent. The death rate for this disease has now risen continuously for 8 years.

There are, nevertheless, certain encouraging aspects in the problem of

diabetes. Despite the rapidly rising death rate, diabetics are living longer today than ever before. The average duration of their lives from the onset of the disease, to death, has increased materially since the discovery of insulin. Recent investigation has shown that the death rate has declined among persons under 45; but among older people, particularly among women, the rate has increased. It is in these older age ranges that the incidence of the disease is highest; and here the rise in the death rate has more than counterbalanced the drop in the younger age groups.

The mortality from heart disease, the leading cause of death since 1922, continued to mount, in 1932, with the rate reaching the new high point of 157.4 per 100,000. This is a rise of 4.9 per cent from the previous maximum recorded in 1931 and of 11 per cent, as compared with the figure for 1911. Since 1919, there has been a decided upward trend in the cardiac disease death rate, although the increase has been by no means continuous.

The one bright spot with respect to the heart disease mortality record is that the rate is declining at the younger ages. This means that such items as school medical inspections, industrial hygiene, and other preventive efforts against heart disease are bearing fruit; for, while heart conditions usually cause death late in life, they often begin in childhood or adolescence. As cases of diphtheria, the other infectious diseases of childhood, tonsillitis, dental diseases, and other focal infections become fewer,

cardiac impairments at the younger ages may be expected to decrease in number.

The death rate for all kinds of accidents combined was lower in 1932 than ever before. This reflects, primarily, the drop during that year in industrial activity, in transportation, and more particularly in automotive traffic, both pleasure and commercial. The decrease in automobile fatalities, as compared with 1931, amounted to 14 per cent.

Three types of accidents recorded lower death rates in 1932 than ever before, namely, accidental burns, machinery accidents, and railroad accidents.

The rise in the suicide death rate in 1932 was less than 6 per cent, a smaller year-to-year increase than has been observed in a number of previous years. The facts concerning suicide show clearly that the rise in the death rate, since 1929, is not entirely chargeable to the unfavorable economic conditions which have prevailed during the last 3 years. There has been a continuation of an upward trend that has been in evidence since 1925—over a period which includes some of the most prosperous years in the history of the country. Furthermore, the suicide situation has improved materially in two decades. For the last year, 10.8 Metropolitan industrial policy holders in every 100,000 took their own lives, whereas in 1911 suicides accounted for 13.3 deaths per 100,000.—*Stat. Bull. Met. Life Ins. Co.* 14:1-8 (Jan.), 1933.

# PUBLIC HEALTH ENGINEERING

## SHELLFISH TREATMENT PLANT AT NEWBURYPORT, MASS.

EDWARD WRIGHT

*Sanitary Engineer, Massachusetts Department of Public Health, Boston, Mass.*

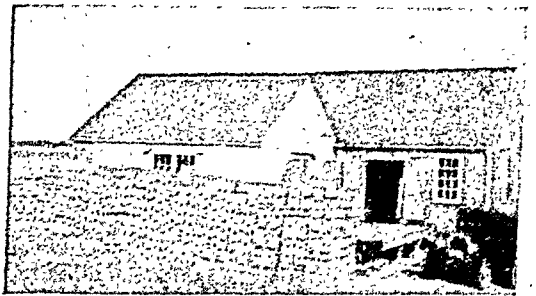
FOLLOWING an extensive examination in 1925 of the Massachusetts tidal waters and the shellfish therein, the State Department of Public Health closed to shellfishing many thousands of acres of shellfish producing areas. This action caused considerable distress in many localities where shellfishing was an important industry, especially in the city of Newburyport where some 3,000 acres of flats were declared to be contaminated.

The department has since carried on extensive studies and experiments under the direction of H. W. Clark, Chief Chemist, and Edward Wright, Sanitary Engineer, Massachusetts Department of Public Health, with a view of finding some practical method for the purification of shellfish. It was found that transplanting into clean waters was impracticable when applied to soft shell clams. Therefore, experiments were begun with the use of chlorine. An experimental plant was subsequently established in Newburyport and operated successfully for several months, under varying temperatures.

The present municipally owned plant at Newburyport was built by the city in 1930. It is located at the northern extremity of Plum Island at the entrance to Newburyport Harbor and it is a single story wooden building consisting of a tank room, laboratory, receiving room, and a shipping platform.

The tank room is 50' by 30' in plan

and contains 8 concrete tanks. The cast-iron sea water intake pipe is about 120' long and 4" in diameter. Water is pumped on the incoming tide only by means of a centrifugal pump having a



*Newburyport Shellfish Treatment Plant—  
Laboratory and Shipping Platform—  
(Note boxes used at the plant)*

rated capacity of 350 gal. per min. and driven by a 10 H. P. motor. There are also 2 air blowers, each having a capacity of 54.5 cu. ft. per min. and driven by a 5 H. P. motor. Each tank is 16' long, 5' wide and 5' deep, and capable of holding about 35 bbl. of clams. The tanks are provided with 4" inlet pipes and 6" outlets and two 1" galvanized iron perforated air pipes near the bottom of the tank.

Upon arrival at the plant the clams are "culled" over to remove all dead or damaged shellfish and then they are placed in boxes of wood and wire construction holding about  $\frac{1}{2}$  bushel each. Before being placed in a tank the raw clams are washed in sterilized sea water and the same process is repeated at the end of the treatment. As sea water is

pumped into the tank a sufficient quantity of sodium hypochlorite solution is added to sterilize the water. During the treatment period smaller quantities of chlorine are added at 2-hour intervals until the residual free chlorine is brought up to about 0.3 or 0.4 p.p.m. It has been found that chlorine if present in excess of 0.5 p.p.m. would interfere with the natural functioning of the clams upon which the purification process depends. To replenish the oxygen consumed by the clams, air is blown intermittently in the tank, which also helps to obtain a more uniform diffusion of chlorine.

Samples of raw and treated clams of each lot are tested daily in the laboratory of the plant. All shellfish are treated for at least 24 hours, and, in case the raw scores are found to be 140 or more, longer treatment periods are required.

All shellfish are dug and transported to the treatment plant under the supervision of deputy wardens appointed by the State Supervisor of Marine Fisheries, and daily receipts, as well as weekly reports, containing information regarding quantities of shellfish dug, areas dug from, etc., are mailed to the Supervisor of Marine Fisheries and duplicates to the Department of Public Health. Daily reports of the bacteriological and chemical laboratory at the plant are mailed to this department, giving the results of bacterial tests of the raw and treated product. The operation of shellfish treatment plants is controlled by the State Department of Public Health under authority of Chapter 235 of the Acts of 1930, which provides that all such plants shall be approved in writing by the Commissioner of Public Health as to the location, construction, and operation thereof, and as to the person in immediate charge thereof.

The law also provides that the commissioner may revoke the approval of

the plant at any time, and it authorizes the department to promulgate rules and regulations. Such rules and regulations have been drawn up, and the operation of the plant is checked up regularly to see that it is operated in conformance with the said rules and regulations. Samples of raw and treated shellfish are collected frequently and tested at the state laboratory.



*Newburyport Shellfish Treatment Plant—  
Tank containing clams in process of  
purification*

The operation of the shellfish treatment in plants in Newburyport and elsewhere has proved beyond doubt the practicability of purifying shellfish by means of chlorine. As a result, large clam growing areas have been reclaimed and work has been provided for hundreds of men.

A copy of the rules and regulations under which this and other similar plants are operated follows. Shellfish treatment plants have been established subsequently at Plymouth and Scituate but the Newburyport plant is the only one now in operation. These plants appear to be a financial success when the clam business is good.

The writer has charge of shellfish in-

vestigations, and supervision of treatment plants. He is assisted in this

work by A. C. Bolde who collaborated in preparing this article.

RULES AND REGULATIONS RELATIVE TO THE OPERATION OF PLANTS FOR THE TREATMENT OF SHELLFISH PROMULGATED UNDER THE PROVISIONS OF ACTS OF 1928, CHAPTER 323, ACTS OF 1929, CHAPTER 372 AND ACTS OF 1930, CHAPTER 235

*Adopted by Massachusetts Department of Public Health on March 8, 1932*

1. All shellfish treatment plants shall be kept under adequate supervision by a qualified chemist or bacteriologist at all times, and no shellfish shall be taken therefrom until passed by the person in charge after treatment as provided in the following rules and regulations:

2. The person in immediate charge of a shellfish chlorinating plant shall send a detailed description in writing to the Department of Public Health of all areas from which it is proposed to take shellfish for treatment purposes at least 1 week before shellfish are to be taken therefrom. Upon taking shellfish from a contaminated area under a written permit from the Supervisor of Marine Fisheries the person holding the said permit shall forthwith deliver the shellfish so taken to the person in charge of the treatment plant or his assistant and receive a receipt therefor either as to the quantity or weight, and as to the date and hour of delivery. Duplicate receipts shall be forwarded weekly to the Department of Public Health.

3. Storage compartments shall be provided for untreated shellfish, and all such shellfish shall be kept wholly separate from treated shellfish. The said compartments shall be under the supervision of the person in charge of the plant. A separate entrance shall be provided for the untreated shellfish. All shellfish shall be handled and stored under such conditions as will keep them alive.

4. All shellfish shall before treatment be thoroughly washed or hosed either with sterile sea water or water from some other source approved by the department, until all foreign matter is removed. All shellfish shall again after treatment be thoroughly washed or hosed with water taken from a source approved by the Department. In washing or dousing the shellfish in chlorinated water, the water shall contain throughout this process at least 0.5 p.p.m. of available chlorine.

5. All shellfish shall be thoroughly culled or inspected before filling the containers used for treatment purposes, and all shellfish shall again be thoroughly culled or inspected after treatment. All dead shellfish or shellfish in broken or cracked shells shall be destroyed.

6. Containers used in the treatment process

shall be filled under the supervision of the person in immediate charge, and the containers shall not be filled with shellfish to a depth of more than 8 inches. In filling the containers a clearance of at least 1 inch shall be left between the upper layer of shellfish and the upper rim of the container. Containers used for treatment purposes shall not be used for any other purpose, and no containers or other equipment used on the flats shall be placed in the treatment tanks.

7. When shellfish are taken from several contaminated areas for treatment purposes, those taken from each separate area shall be treated in separate treatment tanks and shall not be mixed with shellfish from other areas.

8. All water in shellfish treatment tanks shall be subjected to chlorine treatment, and no shellfish shall be passed until the same have been treated for at least 24 hours, and for a longer period if the scores of the raw shellfish are 140 or over, in water which shall have been sterilized by chlorine and contain at least 0.5 p.p.m. of available chlorine 15 minutes after application, and the water shall be maintained in a reasonably sterile condition throughout the entire treatment period. Each treatment tank shall be filled with sea water from the usual source at least twice during the treatment period of each lot of shellfish. Determinations of the amount of dissolved oxygen in the water in the treatment tanks shall be made in order to ascertain that oxygen to the extent of at least 30 per cent of saturation is always present. Two or more samples of each lot of raw shellfish and four or more samples of each lot of treated shellfish shall be examined by the Standard Methods of the American Public Health Association for the determination of the *B. coli* score. Records containing the following information shall be available at the treatment plant at all times:

- a. Area where shellfish were dug
- b. Quantity of shellfish in tank
- c. Time of starting treatment.
- d. Time of ending treatment
- e. Scores of shellfish before treatment, as soon as available
- f. Scores of treated shellfish, as soon as available

- g. Time and quantities of chlorine applied
- h. Available chlorine determinations
- i. To whom sold

No shellfish shall be removed from the treatment tanks until the 24-hour results of the untreated shellfish are read.

9. The results of the analyses of all samples, signed by the bacteriologist, shall be sent by mail to the Department of Public Health on each day that the plant is in operation.

10. Treatment plants shall be used for no purpose other than the handling of shellfish, and no shellfish from clean areas shall be handled at a shellfish treatment plant or by the management of such a plant. Material foreign to this particular business shall not be stored within the plant. No person not an employee of the shellfish treatment plant or a representative of the Department of Public Health or Department of Conservation shall be allowed access to the treatment plant or to the laboratory except by permission of the person in charge. All shellfish treatment plants shall be provided with suitable toilet facilities.

11. A portion of the plant may be used for shucking purposes, and the operation of this portion of the plant shall be under the supervision of the person in charge of the

plant. Such a shucking plant shall be constructed and operated in general accordance with the U. S. Public Health Service Minimum Requirements for approval of State Shellfish Control Measures and Certifications for Shippers in Interstate Commerce.

12. Only clean containers shall be used for shipping treated shellfish in the shell. If bags are used for this purpose all such bags shall be sterilized before being used. Only non-returnable, clean containers shall be used for shipping shucked shellfish.

13. If the shellfish are shipped from the plant in the shell, the shipping containers shall be suitably sealed and marked as "Passed. .... shellfish treatment plant." If the shellfish are shucked at the plant, the shipping containers shall be suitably sealed and marked as "Passed and Shucked .... shellfish treatment plant."

14. All other rules and regulations prepared by this department or by the Supervisor of Marine Fisheries of the Division of Fisheries and Game relative to shellfish shall be followed in the operation of all shellfish treatment plants. The Department reserves the right to change the above rules and regulations from time to time as occasion may require without notice.

## THE OXIDATION POTENTIAL CONCEPT OF CHLORINATION \*

F. C. SCHMELKES

*Wallace & Tiernan Co., Newark, N. J.*

MEASUREMENTS were presented of the oxidation potential in solutions of hypochlorous acid, chloramine, monochloroglycine and Azochloramide. These measurements were compared with measurements of the rate of bacteria removal. The oxidation potential and bactericidal properties of chlorine were found to run parallel. Any changes which diminish bactericidal

velocity also diminish the oxidation potential, and *vice versa*.

Attention was drawn to the failings of the orthotolidin test as the reagent reduces the pH of the solution to be measured, due to the large amount of hydrochloric acid in the reagent, and thereby increases the oxidation potential to a high value. This test essentially measures the amount of chlorine which can be converted into bactericidal and sterilizing chlorine by lowering the pH. The test therefore does not distinguish between chlorine

\* Abstract of paper read before the Public Health Engineering Section and Conference of State Sanitary Engineers at the Sixty-first Annual Meeting of the A. P. H. A., at Washington, D. C., October 24, 1932.

compounds of high and low oxidation potential.

Attention is drawn to the fact that in the ammonia-chlorine process advantage is deliberately taken of the reduction of the oxidation potential to prevent combination of chlorine with phenols, to prevent oxidation of organic matter thus increasing persistency of

the residual, and that this is being done at the expense of bactericidal velocity.

A motion picture was presented, showing the slow death, cessation of movement, agglutination, and disintegration of typhoid bacteria, brought about by treatment with low potential chloramine compounds.

## INDUSTRIAL HYGIENE

Division of Occupational Diseases, Connecticut, Annual Report, 1931—This *Annual Report* of the Connecticut State Health Department, 1931, carries 52 pages devoted to the Division of Occupational Diseases, headed by Dr. Albert S. Gray.

During the course of the year, 391 cases of occupational diseases were recorded, only 141 of which, however, were reported by physicians. "Occupational disease is almost entirely preventable, yet it is now costing Connecticut industry millions a year in decreased production, compensation, and medical claims."

There is a discussion of the health relationships of dust, fumes, gases, and toxic materials, ventilation, illumination, sanitary facilities, industrial fatigue, maintenance and supervision. During the year the division made a total of 267 field trips, including 72 surveys of plant conditions. A code is used to classify both hazards and industrial pursuits.

Special studies were made of: (1) soapstone dust exposure, which showed that workers were exposed to an excessive amount of dust; (2) dust hazards of sandblasting; (3) dustiness in wood working operations associated with both dermatitis and pneumoconiosis; (4) foundry dust; (5) lead exposure in brass foundries, which showed that lead present in dust samples was

well below the amount that would constitute a lead hazard as defined by the A.P.H.A.; (6) mercury poisoning, in which it was concluded that the average individual would develop symptoms under the conditions found within a period of several months; (7) carbon monoxide, in which it was found that this gas frequently exceeded toxic limits; (8) exhaust ventilation of spray coating booths, where low velocities were found which might result in poisoning; (9) carbon tetrachloride in dry cleaning in which the discussion relates principally to methods of estimating low concentrations—0.16 per cent being taken as the lower toxic limit; (10) a method for determining benzol vapors; (11) simple preventive measures in connection with dermatitis from soap solution and from cyanide hardening operations; and (12) suggested regulations concerning fumigation with cyanide gas.

There is also a brief review of the Eastern Interstate Conference on Labor Legislation called in June, 1931, by Governor Pinchot of Pennsylvania, and held in Harrisburg. The division likewise carried on various educational activities, held an industrial hygiene exhibit at the New Haven Industrial Exhibition, and entertained a number of foreign visitors. A list is given of the occupational diseases reported, by cause and compensability. E. R. H.



## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Venereal Disease Control the Country Over**—What official and voluntary agencies attempted during 1932 is recounted state by state. The outstanding conditions seem to be: heavy clinical burdens, reduction in support, and determination in face of discouragement.

ANON. With the States and Communities in 1932. *J. Soc. Hyg.* 19, 2:52 (Feb.), 1933.

**Toxin vs. Virus**—The findings of a report of interesting research include: diphtheria toxin added to vaccine virus exerts a deterrent action upon "take" and systemic response in rabbits; the action of the toxin is neutralized by antitoxin; and the site of a positive Schick test is insusceptible to vaccine virus for three weeks.

ARMSTRONG, C. Modification of the Vaccine Response in Rabbits by the Application of Diphtheria Toxin to the Vaccination Site. *Pub. Health Rep.* 48, 1:1 (Jan. 6), 1933.

**When Babies Refuse the Quart a Day**—Two delicious excerpts from this delightful paper: "There is too much competition in weight-gaining during infancy and childhood, and this one fact gives the child the whip hand throughout its young life. It does not take a child long to sense that fat babies and thin mammas are the style." And, "Meal time should be a happy, quiet time. A mad cabaret with one or more of the family acting as whirling dervishes has no place at the child's meal time."

ARNOLD, D. P. Why a Child Refuses to Eat. *New York State J. Med.* 33, 1:20 (Jan. 1), 1933.

**Do Public Dumps Menace Health?**—This British sanitarian views with alarm "tipping" (euphonic synonym for our "dumping") because

cloths used by syphilitics might lie in the dumps. "I cannot imagine," he shivers, "any more unjustifiable risk than is contained in this particular alone to public health." This seems to us to be the height of something-or-other.

BALDWIN, H. B. C. Disposal of House Refuse. *J. Roy. San. Inst.* 53, 7:359 (Jan.), 1933.

**Limitations of Health Yardsticks**—Graphs depicting the decline in general and particular death rates are included in this paper which confesses the decided limitations of the general statistical measures of the public health.

BRITTEN, R. H. Trends of Health in the United States. *Pub. Health Rep.* 48, 2:27 (Jan. 13), 1933.

**Our Public Enemies**—First come the quacks, says this author, the Christian Science healer, the chiropractors and naturopaths; then the anti-vaccinationists, but the greatest menace of all are the anti-vivisectionists. This is an excellent paper, though the author neglects to pay his compliments to the fundamentalists who insist that the youth of our land be taught science a la revelation.

CANNON, W. B. Enemies of Society. *Sci. Monthly*, Feb., 1933, p. 150.

**Voice Crying in Wilderness**—These are serious conclusions: hospitalization of maternity cases increases, but puerperal mortality does not decrease; meddlesome midwifery and puerperal infections seem to be the major causes; something is wrong with maternity wards in general hospitals; architectural and administrative isolation is needed.

DELEE, J. B. and SIEDENTOPF, H. The Maternity Ward and the General Hospital. *J.A.M.A.* 100, 1:6 (Jan. 7), 1933.

**When Colons Disfunction—**Glib "health educators" who broadcast cure-all diets for preventing constipation would do well to ponder over this meaty discussion of the disfunctioning colon.

JORDON, SARA M. *The Unstable Colon and Neurosis.* J.A.M.A. 99, 27:2234 (Dec. 31), 1932.

**New Angles of Venereal Disease Prevention—**Venereal disease control problems as viewed today suggest only minor changes in program emphasis to meet modern conditions. The recommendations of this able paper are: treatment facilities at high efficiency level to meet increased demand; community measures to meet the needs of the new nomads; recognition of effect of poverty on the family.

KEYES, E. L. *The Present Status of Venereal Disease Prophylaxis—Social and Medical.* J. Soc. Hyg. 19, 1:1 (Jan.), 1933.

**Is There a Polio Susceptible Body?—**Fifty-two little poliomyelitis patients were compared with controls in respect to physical characteristics. No evidence of a direct relation of certain characteristics to susceptibility to poliomyelitis was discovered. Draper's findings were not confirmed.

LEVINE, M. I., *et al.* *Relation of Physical Characteristics to Susceptibility to Anterior Poliomyelitis.* J.A.M.A. 100, 3:160 (Jan. 21), 1933.

**Knocking Some Props From Under Contraception Statistics—**Women who have been delivered in eastern hospitals are being asked by their medical attendants about their contraceptive practices. Of the white women, 36 per cent use some means, a smaller proportion than is commonly assumed. Later reports will give more detailed findings, but there is much food for speculation here. For instance, this finding: with contraception as actually practiced, there was a reduction in the pregnancy rate under 20

per cent below that which obtained in the group not resorting to this procedure—not a high degree of effectiveness.

PEARL, R. *Preliminary Notes on a Coöperative Investigation of Family Limitation.* Milbank Quart. Bull. 11, 1:37 (Jan.), 1933.

**Catching Bedbugs in Molasses—**Health workers who meet the bedbug problem in all its ugliness will want to know the latest wrinkles. This British genius has invented a "trench trap" which is placed all around the infested room. The trench is filled with treacle in which the bugs proceed to drown themselves.

MILLARD, C. K. *Presidential Address on an Unsavory But Important Feature of the Slum Problem.* J. Roy. San. Inst. 53, 7:365 (Jan.), 1933.

**Debunking Posture—**"But posture is said to be related to health, to mentality, and to morality. This being the case, it is somewhat confusing to find very delicate and stupid and immoral subjects at the A end of posture distribution, and very vigorous, bright, and honorable children at the D side.

"Even if mentality and morality and health *did* depend on carriage and they are subject to change from what is called poor to better posture, they must relapse with it when the spine returns to its usual curvature, as it apparently always does."

ROGERS, J. F. *The Long and the Short of the Carriage Business.* Health and Phys. Ed. 3, 10:11 (Dec.), 1932.

**Poliomyelitis Streptococcus and Convalescent Serum—**It must be trying to the pundits, who assert that Rosenow's poliomyelitis streptococcus just doesn't exist, to have it continue as the subject of researches, all of which seem to indicate that the condemned microörganism is very much alive. This paper reports the effect of convalescent serum upon the streptococcus.

ROSENOW, E. C. A Specific Reaction of Convalescent Serum on the Streptococcus Isolated in Studies of Poliomyelitis. *J. Immunol.* 33, 6:455 (Dec.), 1932.

**Who Teaches Health in Boston?**—The many agencies doing health education in the City of Boston are reported upon. Their very number and diversity of interests are eloquent of the need for some coördinating organization. A lesson here for all.

PARSONS, R. I. and TURNER, C. E. Health Education in the City of Boston. *New Eng. J. Med.* 208, 1:19 (Jan. 5), 1933.

**Almoners in British Hospitals**—Almoner, it seems, is the name hit upon by our British cousins to designate the job of hospital social worker. The chief difference from our h.s.w.'s seems to be that appointee must be a "lady" as understood in its old-fashioned sense."

TELLING, W. H. M. The Rôle of Hospital Almoners in the Maintenance of Health and the Avoidance of Disease. *J. State Med.* 41, 1:21 (Jan.), 1933.

**The Doctor Looks at Statistics**—Of about 1,400 cases in Baltimore families in this study, nine-tenths exhibited coryza, two-thirds had cough,

nearly half had sore throat, about a fourth were in bed. Three colds per year per person was the mean.

VAN VOLKENBURGH, V. A. and FROST, W. H. Acute Minor Respiratory Diseases Prevailing in a Group of Families Residing in Baltimore (Md.), 1928-1930. Prevalence, Distribution, and Clinical Description of Observed Cases. *Am. J. Hyg.* 17, 1:122 (Jan.), 1933.

**Experience With Whooping Cough Vaccine**—Of 300 children immunized with pertussis vaccine, 8 were certainly exposed and 127 probably exposed to whooping cough infection. None contracted the disease. The authors warn against stock vaccines.

SAUER, L. Whooping Cough. *J.A.M.A.* 100, 4:239 (Jan. 28), 1933.

**And Still We Die From Appendicitis**—"If appendicitis is increasing, as is possibly the case, why is not a share of the solution of the problem one of preventive medicine?" The answer to this purely rhetorical question is that the public must somehow learn that delay and improper medication, especially catharsis, invite mortality. Incidentally, most physicians also have something to learn about appendectomy.

WALKER, I. J. A Comparative Mortality Study of Acute Appendicitis. *New Eng. J. Med.* 208, 3:113 (Jan. 19), 1933.

## BOOKS RECEIVED

**HOW TO BUDGET HEALTH.** Guilds for Doctors and Patients. By Evans Clark. New York: Harper, 1933. 328 pp. Price, \$4.00.

**A GENERAL HISTORY OF NURSING.** By Lucy Ridgely Seymer. New York: Macmillan, 1933. 317 pp. Price, \$2.75.

**YOUR TEETH. THEIR CARE AND PRESERVATION.** By Lewis H. Urling. Philadelphia: Dorrance, 1932. 67 pp. Price, \$1.50.

**A DECADE OF DISTRICT HEALTH - CENTER PIONEERING.** Ten Year Report of the East Harlem Health Center. New York, 1932. 148 pp. Price, \$1.00.

**INFANTS AND CHILDREN. THEIR FEEDING AND GROWTH.** By Frederic H. Bartlett. Farrar & Rinehart, 1932. 409 pp. Price, \$1.50.

**FOOD IN HEALTH AND DISEASE. Preparation, Physiological Action and Therapeutic Value.** By Katherine Mitchell Thoma. Philadelphia: Davis, 1933. 368 pp. Price, \$2.75.

**PROCEDURES IN TUBERCULOSIS CONTROL.** For the Dispensary, Home and Sanatorium. By Benjamin Goldberg. Philadelphia: Davis, 1933. 373 pp. Price, \$4.00.

**A HEALTH INSTRUCTION GUIDE FOR ELEMENTARY SCHOOL TEACHERS.** By Jeanie M. Pinckney. Austin, Texas: University of Texas, 1932. 368 pp. Price, \$1.00.

**THE ADOLESCENT BOY.** By Winifred V. Richmond. New York: Farrar & Rinehart, 1933. 233 pp. Price, \$2.50.

**CRIMES AND CRIMINALS.** By William A. White. New York: Farrar & Rinehart, 1933. 276 pp. Price, \$2.50.

**26TH ANNUAL REPORT OF THE SECRETARY.** National Canners Association: 36 pp. Copies free to members of the A.P.H.A. by applying to the company, 1739 H Street, Washington, D. C.

## NEWS FROM THE FIELD

### "THE LAWYER AND HIS PUBLIC"

A SERIES of radio broadcasts is being offered under the joint auspices of the American Bar Association and the National Advisory Council on Radio in Education. The general subject of the series will be "The Lawyer and the Public," non-technical in nature, and will include 15 broadcasts given by leading members of the legal profession. The broadcasts will be 15 consecutive Sunday evenings, 6:00 to 6:30 Eastern Standard Time, and will be given over a nation-wide network of the Columbia Broadcasting System.

### YELLOW FEVER VOLUNTEER DIES

THE death of Paul Hamann, of East Moline, Ill., one of the volunteers in the yellow fever experiment in Cuba in 1900-1902, has been reported. He died of broncho-pneumonia following influenza after an illness of one week. Mr. Hamann was one of the 15 living volunteers who received gold medals and pensions of \$125 per month authorized by Congress in 1929. The medals were presented in 1931.

### PRIZE FOR ESSAY ON GOITER

THE American Association for the Study of Goiter again offers \$300 as a first award and 2 honorable mentions for the three best essays based on original research work on any phase of goiter, to be presented at its annual meeting in Memphis, Tenn., May 15-17. Competing manuscripts must be in English and submitted to Dr. Julius R. Yung, 670 Cherry Street, Terre Haute, Ind., not later than April 1. Manuscripts arriving after this date will be held for the next year or returned on request.

### HEART COMMITTEE MEETING

A SCIENTIFIC meeting of the Committee on Cardiac Clinics of the Heart Committee of the New York Tuberculosis and Health Association was held on February 28 at the New York Academy of Medicine. Papers read included one by Dr. Eugene M. Landis, and one by Dr. J. Murray Steele, and discussions by Dr. J. Hamilton Crawford and Dr. Alfred E. Cohn.

### NATIONAL BOYS' WEEK

A MANUAL of suggestions for the preparation of a complete program for each day of Boys' Week—April 29 to May 6—is in preparation. The Committee will be glad to mail, gratis, copies of this manual directly to any unit of your organization which requests them.—National Boys' Week Committee, 211 West Wacker Drive, Chicago, Ill.

### A.N.A. DELEGATES TO CONGRESS

THE official delegates from the American Nurses' Association to the Congress of the International Council of Nurses in Paris and Brussels next July were named at the January board meetings. They are Elnora E. Thomson, Susan C. Francis, Adda Eldredge and Katharine Tucker. Some 25 persons from the United States are on the program either for papers or for discussions. Miss Thomson, Miss Geister, Miss Roberts, and Miss Eldredge are among those invited to read papers.

### OHIO STATE HEALTH DEPARTMENT

REORGANIZATION of the Ohio State Health Department into 6 divisions instead of 9 was announced

in December, 1932, by Dr. Harry G. Southard, Ohio State Health Officer, Member A.P.H.A. Dr. Emery R. Hayhurst, of Columbus, F.A.P.H.A., formerly consultant in the division of industrial hygiene, has been appointed chief of that division. Dr. Elgie R. Shaffer, F.A.P.H.A., was appointed chief of the child hygiene division. Dr. Reaves W. DeCrow, of Portsmouth, member A.P.H.A., succeeds Dr. Shaffer as head of the bureau of local health organization.

### PERSONALS

MARY AUGUSTA CLARK, F.A.P.H.A., is now Research Associate in the Division on Community Clinics of the National Committee for Mental Hygiene. In this position, Miss Clark is continuing a consultant service with reference to statistical records and reports in child guidance and adult psychiatric clinics which she has given for the past 7 years as a member of the Commonwealth Fund.

JANET M. GEISTER, R.N., director at headquarters of the American Nurses' Association, resigned January 30, the resignation to go into effect March 15. Mrs. Alma Scott, the associate director, will carry on the director's duties for the present.

MRS. MARIE F. KIRWAN, of the State Charities Aid Association of New York, is now chairman of the Department of Public Welfare, New York State Federation of Women's Clubs. This includes all forms of health activities covered by the clubs.

DR. FRANK JOSEPH JIRKA, of Chicago, was appointed Illinois State Health Director on January 25. During the 40 years of its existence, 5 different physicians filled the office of chief executive for one full term or more. Dr. Jirka succeeds Dr. Andy Hall, of Springfield, member A.P.H.A., who resigned.

### DEATHS

CHARLES BUCKLEY MAITS, M.D., F.A.P.H.A., Director of the Department of Public Health of Pittsburgh, Pa., died early in January. Dr. Maits was active in the Air Pollution Investigation, which has been carried on for years by the Mellon Institute of Industrial Research.

DR. H. K. READ, F.A.P.H.A., of Houston, Tex., died in December, 1932. He was the supervisor of hygienics for the Houston public schools for the last six years.

### CONFERENCES

March 21-25, Fourth Pan-American Medical Congress, Dallas, Tex.

April, American Physiological Society, Cincinnati, Ohio.

April 3-8, New York Food and Health Exposition, Grand Central Palace, New York, N. Y.

April 4-6, American Water Works Association, Southeastern Section, Albany, Ga.

April 29-May 6, National Boys' Week.  
May 29-31, Western Branch, A.P.H.A., Pasadena, Calif.

June, State and Provincial Health Authorities of North America, Washington, D. C.

June, State and Territorial Health Officers Conference, Washington, D. C.

June 11-17, National Conference of Social Work, Detroit, Mich.

June 12-17, American Medical Association, Milwaukee, Wis.

June 26-30, National Tuberculosis Association, Toronto, Canada.

June 26-30, Annual Meeting of the American Home Economics Association, Milwaukee, Wis.

June 27-July 1, Convention of the Association for Childhood Education, Denver, Colo.

July 1-7, National Education Association, Chicago.

July 5-9, International Union of the Protection of Childhood, Paris.

July 10-15, International Council of Nurses, Paris, July 10-12; Brussels, July 13-15.

July 18-20, International Congress of Pediatrics, London.

July 25-29, British Medical Association, Dublin.

July 29-August 4, World Federation of Education Associations, Dublin.

#### MEDICAL BUREAU

The Medical Bureau has available class A physicians, dentists, graduate nurses and laboratory workers who have specialized in public health work. All credentials have been thoroughly investigated. Those in need of such personnel may receive complete biographies including statements regarding candidates' ability, integrity, and responsibility. No charge to employers for the introduction of applicants. M. Burneice Larson, Director, The Medical Bureau, Pittsfield Building, Chicago.

## The AMERICAN JOURNAL of NURSING

450 Seventh Avenue  
New York City

•  
*Single Copies 35¢*

One Year \$3.00

Two Years \$5.00

•  
Foreign and Canadian Postage  
50¢ extra per year

•  
*In Clubs of ten or more new or  
renewal subscriptions*

\$2.50 each

# « Announcement »

. . . Beginning January 1, 1933, THE AMERICAN JOURNAL OF CANCER will be published every month instead of every two months as last year. Its popularity and the increased amount of authoritative articles have forced this more frequent publication.

. . . There will be three volumes this year « » one for each four months. The subscription rate is \$3.50 per volume or \$9.00 for one year covering three volumes (rates for Canada and foreign countries given on request).

. . . A complimentary sample copy will be gladly sent you for your examination.

## THE AMERICAN JOURNAL OF CANCER

654 Madison Avenue

»

«

New York, N. Y.

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

April, 1933

Number 4

## Recognition and Control of Tuberculosis of Childhood\*

EUGENE L. OPIE, M.D.

*Department of Pathology, Cornell University Medical College,  
New York, N. Y.*

MUCH progress has been made during the last decade in the recognition of pulmonary tuberculosis of both children and adults. We know more about the potential significance of the lesions that are recognizable, and this knowledge I have no doubt can be used to facilitate its control if applied primarily to children known to be living in contact with the disease. Furthermore, tuberculosis may be added to the list of diseases that may be effectively combated in school children.

This increase of knowledge has come from a variety of sources in part apparently far removed from practical uses. We have long admitted the approximate truth of the statement that everybody has a little bit of tuberculosis. A few years ago the occurrence of tuberculous lesions in the bodies of those who had died from other diseases was regarded as an interesting pathological observation of scant practical significance. Evidence collected very recently has shown that tuberculous lesions of children and adults who are

apparently in good health show wide variation in extent and severity. Roentgenological examination and tuberculin tests often reveal in the chests of apparently healthy persons extensive tuberculous lesions that though latent are progressive and ultimately develop clinically manifest disease, with its well known symptoms and physical signs. The early diagnosis and cure of tuberculosis is in considerable degree contingent upon the recognition of pulmonary disease before it has undermined health.

Widespread recognition of the significance of the tuberculin reaction and demonstration that roentgenological examination of the chest reveals both healed lesions and potential disease profoundly alters our conception of the epidemiology of tuberculosis. The tuberculin reaction discloses existing tuberculous infection, and roentgenological examination within certain technical limitations measures its anatomical extent. Consideration of the occurrence and spread of tuberculosis formerly included only those who were actually suffering with the disease. Now it is possible to determine the incidence of tuberculous infection that has not

---

\* Prepared for the Public Health Nursing Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

impaired health, to measure its severity, to separate with a fair degree of accuracy healing and potentially progressive infection, and to follow the gradual transition of the latter into manifest disease.

Two varieties of investigation have been notably successful:

1. Study of the spread of tuberculous infection in families in which some member suffers with the disease. This form of investigation has for the first time disclosed the progressive development of latent tuberculous lesions in those exposed to the contagion, and has shown how frequently in contact children these occult lesions pass over into clinically manifest disease. It has given an insight into the spread of the disease among those exposed to it heretofore not obtainable.

2. Study of the occurrence of tuberculosis in school children offers the opportunity to determine the incidence of infection in otherwise unselected groups of children between ages 5 and 18 years. It has again shown the frequency of advanced tuberculous infection in those who are apparently well, and has disclosed furthermore a significant number of children who are suffering with clinically manifest tuberculosis that has not attracted the attention of their parents, teachers or physicians. It has shown that tuberculosis can be added to the list of diseases that may be profitably combated in public and other schools, and has further demonstrated that open air schools, summer camps, and preventoria can accomplish very little in the control of tuberculosis until attention of those concerned with their conduct is focused upon the technical medical problem involved in the discovery and prophylactic care of the disease.

The procedures outlined have been used with varying success in a number of places in this country with the double purpose of applying methods adapted

to early recognition of the disease, and of obtaining new information concerning its prevalence and mode of spread. In some instances it is not fully realized that recognition of tuberculosis is dependent upon technical methods that require considerable training and experience, and that the interpretation of the results obtained demand an intimate knowledge of the pathology, pathogenesis, and clinical course. To speed the progress of this work, it is highly desirable that observations be made in different places by comparable methods and that the lesions under consideration be described and classified, though perhaps differently, in such terms that one observer may understand another.

#### HOUSEHOLD CONTACT WITH TUBERCULOSIS

Studies made at the Henry Phipps Institute (Opie and McPhedran) have shown how tuberculosis, recognized before it produces symptoms, and as clinically manifest disease as well, spreads through households exposed to a person suffering with it. The fate of exposed children varies with age. A large part of the infants who are infected and become sensitive to tuberculin die from the disease. Young children are promptly infected, and during the first five years of life, more than 80 per cent exposed to tuberculosis in their homes react to tuberculin. Nevertheless, in the period between 5 and 15 years tuberculosis in the children of these families tends to pursue a benign course. At this time of life, calcified nodules of healing tuberculosis make their appearance in the lungs and adjacent lymph nodes in increasing number as age advances and are demonstrable in roentgenographs. Unfortunately at an earlier stage in their development when the same lesions are caseous, uncalcified and still progressive they are in most instances too small to make any impression upon the X-ray



film. A few, however, are so extensive that they cast a recognizable shadow and are obviously referable to tuberculous infiltration of the lung parenchyma. Such lesions of childhood type may remain latent, but in about one-fourth of all instances, develop symptoms and physical signs and tend to impair health and diminish weight. These children suffer with clinically recognizable pulmonary tuberculosis in the usual sense. Nevertheless it is now widely recognized that in a large part of children between infancy and adolescence infiltrative lesions of tuberculosis tend to pursue a favorable course. Infiltration of considerable extent tends to disappear and soft flocculent or even dense homogeneous shadows may be transformed into the strand-like picture of a fibrous scar. After 10 years of age these pulmonary lesions of childhood type seldom make their appearance in white children. When children living in contact with tuberculosis reach adolescence, latent pulmonary lesions of adult type begin to develop somewhat earlier in girls than in boys, and their frequency increases in the later years of this period of life. These apical lesions pursue a much more unfavorable course than those of the childhood type. In the adolescent and young adult members of exposed families, such lesions often become manifest, causing cough, loss of weight, and physical signs, and with further progress of the disease, tubercle bacilli may be found in the sputum.

#### EXOGENOUS REINFECTION WITH TUBERCULOSIS

The evidence indicates that the lesions of adult type appearing in adolescence are the result of new infection and almost invariably result from continued contact with a person who suffers from the adult type of pulmonary tuberculosis, and disseminates tubercle bacilli present in the sputum.

Apical tuberculosis becomes evident at a time when lesions of first infection are demonstrable as calcified or fibrous scars and are evidently healed or healing. Anatomical and experimental evidence gives abundant support to the opinion that the adult type of tuberculosis is, with few exceptions, the result of exogenous reinfection. Many even yet deny the possibility that adults can acquire tuberculous infection. This opinion is in great part based upon the statistical review of histories of husbands and wives exposed to the contagion of a partner with the disease. When roentgenographic examination was applied to the examination of persons exposed to marital contagion, convincing evidence that approximately half of them acquire apical lesions was obtained (Opie and McPhedran).

In what degree does first infection protect from reinfection? Evidently protection is ineffective since in adolescent children exposed to continued contact with the disease reinfection of adult type often ensues. Animal experiments indicate that with complete healing of a tuberculous lesion, sensitivity to products of the tubercle bacillus subsides and resistance to reinfection disappears. With continued exposure to tubercle bacilli or even with repeated casual contacts with the microorganism, such as evidently occur in children not exposed to household infection, sensitivity and presumably resistance is maintained. Nevertheless long continued exposure to the immediate environment of a person who is expelling tubercle bacilli may overcome this resistance.

#### EXTRA-FAMILIAL INFECTION WITH TUBERCULOSIS

The preceding discussion has shown that familial contact with open tuberculosis almost invariably results in infection, often with the production of extensive lesions and manifest disease.

Tuberculin tests and radiographic examination of children who are not exposed to family contact with the disease reveal tuberculous infection with increasing frequency as age advances, but the incidence is far less than in children with known exposure. Of children in household contact with open tuberculosis, 80 per cent have acquired infection in the period between infancy and 5 years, whereas in children not exposed to family contagion, this incidence of infection is not reached until the age of approximately 17 years (Opie and McPhedran). Radiological examinations show that the lesions of children not obviously exposed to contagion are with few exceptions of scant severity and are recognizable as calcified healed or healing nodules of lungs or lymph nodes. It must be assumed that these infections, almost universal in large cities, are the result of casual contact with the microörganism, but it is not possible to define exactly the conditions under which they occur.

Aronson has shown that intensity of the tuberculin reaction tends to increase with age, so that reactions revealed only when 0.1 or 1 mg. of old tuberculin is used are more frequent in the period from birth to 20 years of age, whereas reactions to 0.01 mg. are more frequent after this age. It is probable that children who are acquiring infection for the first time, usually as the result of casual contact with the disease, pass through a period in which there is scant sensitivity to tuberculin. In view of the increasing frequency with which infection is found by means of the tuberculin test between infancy and early adult life, it is evident that children are constantly coming into contact with tubercle bacilli during this period. Somewhat later in early adult life repeated impact with the micro-organism doubtless continues, since the incidence of the reaction during the age period from 25 to 50 years approximates

100 per cent. The reaction to tuberculin disappears with complete recovery from infection, but sensitivity of adults is in general maintained with greater intensity than that of children. After 70 years of age there is a slight diminution in the incidence of the reaction, perhaps due to diminishing exposure of very old persons to infection.

The evidence available indicates that the childhood type of pulmonary tuberculosis even within the household is an insignificant source of contagion. The usual benign course of this form of the disease, infrequently accompanied by cavity formation, supports this opinion. The adult type of pulmonary tuberculosis which often pursues a chronic course with cavity formation and elimination of tubercle bacilli over a considerable period of years is the chief source of the dissemination of infection. The increase of grave tuberculous infection in adolescence and early adult life is best explained by increasing contact with adults suffering from open tuberculosis. The intimacy of contact in large part determines the severity of infection. The effects of marital contact are now clearly demonstrable. Why adolescent children, girls more frequently than boys, suffer infection is less evident, but might prove a fruitful field for investigation. Possible contagion, I believe, should receive first consideration.

#### CLASSIFICATION OF TUBERCULOUS LESIONS RECOGNIZABLE BY ROENT- GENOGRAPHIC EXAMINATION OF THE CHEST

It is certainly desirable that those who are engaged in the search for tuberculosis in school children and publish reports on the subject classify the lesions they find in such a way that the results of one are intelligible to others. It is, however, doubtful if a system of classification adopted by a committee or other conclave tends to

speed the accumulation of information.

The following classification of tuberculosis has been found useful in our studies of the epidemiology, clinical course, and pathogenesis of the disease conducted at the Henry Phipps Institute:

*Latent Tuberculosis:*

- A. Latent tuberculosis with hypersensitive-ness to tuberculin demonstrated by the intracutaneous test but with no lesions of the lungs demonstrable by roentgenographic examination.
- B. Calcified nodules in the lung.
- C. Latent infiltration of childhood type:
  - (a) Soft or flocculent (potentially progressive)
  - (b) Strand-like (healed)
- D. Tuberculosis of tracheobronchial lymph nodes:
  - (a) Calcified
  - (b) Massive caseous
- E. Latent apical tuberculosis (adult type of latent tuberculosis):
  - (a) Supraclavicular (see further subdivision)
  - (b) Supra- and infraclavicular (see further subdivision)
- F. Manifest pulmonary tuberculosis with sputum negative for tubercle bacilli:
  - (a) Childhood type
  - (b) Adult type
- G. Manifest pulmonary tuberculosis with tubercle bacilli in sputum:
  - (a) Childhood type
  - (b) Adult type
- H. Tuberculosis of organs other than the lungs
- I. Suspected tuberculosis

With this classification the stage of progress may be designated incipient, moderately advanced, or far advanced, and the present status of the disease suggested by the severity of its symptoms may be defined by such terms as quiescent, arrested, and apparently cured, in accordance with customary usage.

The word "latent" to designate tuberculosis unaccompanied by significant symptoms and physical signs is objectionable to some writers because they assume that it means arrested, obsolescent, or healed, but it is noteworthy that the present usage had had

the sanction of both Laennec and Louis who described as latent, phthisis not recognizable during life. In this sense, in accord with daily observation, latent tuberculosis revealed by the tuberculin test on the one hand may be so insignificant that it casts no shadow on a roentgenographic film, and on the other hand, occupying a considerable part of the lung parenchyma may menace health.

When routine roentgenographic examination is applied to groups of persons such as school children, college students, industrial or other workers, who are presumably well, a certain number are found to have conspicuous infiltrating lesions of the lung accompanied by physical signs, such as râles, impaired resonance, or diminished breath sounds. Questions may now reveal some cough or loss of weight that had previously attracted little attention. Although these persons have clinically manifest tuberculosis they form a group not included among those who apply to a physician because they have "come down" with symptoms of tuberculosis. They are found only when X-ray examination is applied to those who are assumed to be well.

DEVELOPMENT OF MANIFEST PULMONARY TUBERCULOSIS FROM LATENT TUBERCULOUS INFECTION

Observations made by McPhedran and the writer in process of publication define the frequency with which different kinds of latent tuberculous lesions become clinically manifest disease. These observations were made upon children attending the dispensary of the Henry Phipps Institute during a period of 8 years, and in different cases the length of observation within this limit has varied widely.

Table I shows the frequency with which latent lesions of childhood type found in children below the age of 15 years become manifest.

Infiltration of the lung of childhood type represented by diffuse opacity or mottling of the roentgenographic film has developed clinically manifest disease in about one-fourth of the instances observed. In these cases pulmonary tuberculosis usually pursues a benign course. Strand-like infiltration with few if any exceptions is a healed lesion and has no more significance than a calcified nodule found in the lung parenchyma.

Massive caseous tuberculosis is a dangerous lesion and in nearly half of the cases observed was ultimately associated with clinical disease.

There is small probability that calcified nodules found in the tracheo-bronchial lymph nodes will give rise to clinical disease. With them the incidence of manifest tuberculosis has been less than 2 per cent, and in many cases the child has remained in contact with the source of infection.

Table II shows the frequency with which latent lesions of adult type have become manifest. Since the fate of lesions varies with their extent, it has

TABLE I

SHOWING FREQUENCY WITH WHICH LATENT LESIONS OF FIRST INFECTION (CHILDHOOD TYPE) IN CHILDREN (0-15 YEARS) DEVELOP CLINICALLY MANIFEST TUBERCULOSIS

<i>Latent lesion</i>	<i>Number of children</i>	<i>Number that developed clinically manifest tuberculosis</i>	<i>Per cent that developed clinically manifest tuberculosis</i>
Soft infiltration of lung	38	9	23.7
Strand-like infiltration of lung	6	0	0.0
Massive caseous tuberculosis of tracheo-bronchial lymph nodes	11	5	45.5
Calcified tuberculosis of tracheo-bronchial lymph nodes	163	3	1.8

TABLE II

SHOWING THE FREQUENCY WITH WHICH WHITE CHILDREN (10 TO 20 YEARS) WITH LATENT APICAL TUBERCULOSIS HAVE DEVELOPED CLINICALLY MANIFEST TUBERCULOSIS

<i>Extent of lesion</i>	<i>Number with latent apical tuberculosis</i>	<i>Number that developed manifest tuberculosis</i>	<i>Per cent that developed manifest tuberculosis</i>
Group 1 Scant lesions	10	2	20.0
Group 2 Approximately half of apex above clavicle	15	5	33.3
Group 3 Equivalent to minimal tuberculosis	12	7	58.3
Group 4 Equivalent to moderately advanced tuberculosis	3	2	66.6

been necessary to separate them into groups. The first group contains scant but definite lesions evident in the film as opaque spots or salients projecting below the margin of the second rib. Group 2 contains lesions occupying approximately half or more of the apex above the clavicle. Groups 3 and 4 contain lesions which extend below the clavicle. In group 3 are lesions equivalent in extent to those of minimal pulmonary tuberculosis, and in group 4 those equivalent to moderately advanced disease.

The table shows that the extent of latent lesions is an index of their danger, the incidence of subsequent manifest disease varying in the different groups from one-fifth to considerably over one-half of the small number of cases observed. Repeated roentgenological examination of these latent lesions is essential in order to determine if they are progressive. It is noteworthy that latent apical lesions

pursue a much more unfavorable course than similar lesions of childhood type.

#### THE TUBERCULIN REACTION

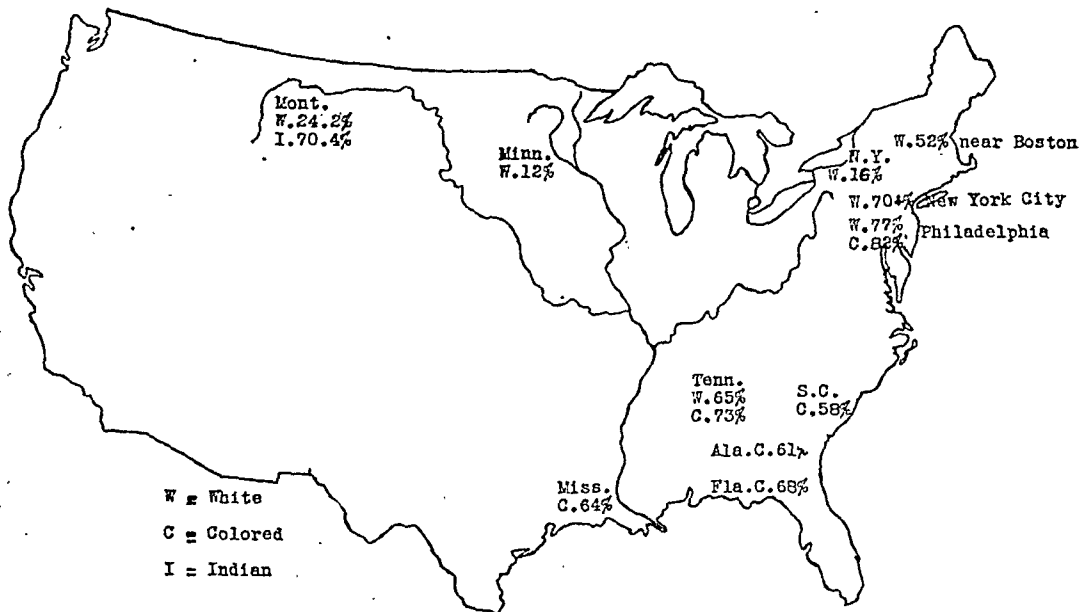
Since the tuberculin reaction is being used with increasing frequency to determine the incidence of tuberculous infection, it may be useful to consider what can be learned from it and the limitations of its usefulness. The method of application is important since exact results are obtainable only by the intracutaneous method with introduction of accurately measured quantities of tuberculin into the dermis.

Tuberculin varies so widely in strength that it is essential to standardize the sample in use by tests on animals. "Old tuberculin" is more

diminishes rapidly with increasing age. Nassau and Sweig found that of 20 children with tuberculin reactions which had appeared during the first 3 months of life, all died; of 16 infected during the second 3 months, 87.5 per cent died; but of 13 infected during the second half of the first year, only 30.8 per cent died. Asserson points out that infants subjected to continuous exposure in their homes have only a slight chance of escaping disease and death from tuberculosis, whereas those who receive their infection more casually and less continuously exhibit much greater resistance.

With increasing age the tuberculin reaction occurs so frequently that it cannot be used to identify children who

FIGURE I—OBSERVATIONS SHOWING PERCENTAGE OF TUBERCULIN REACTIONS AT THE AGE OF 15 YEARS IN SOME PLACES IN THE UNITED STATES



trustworthy than recently introduced preparations the effects of which are as yet uncertain.

In an infant living in contact with tuberculosis a tuberculin reaction recognized in the first few months of life indicates the existence of a grave tuberculous infection from which death will probably result. The prognostic significance of a reaction to tuberculin

will develop clinically manifest tuberculosis. A negative tuberculin reaction however with few exceptions demonstrates the absence of tuberculous infection and renders examination by X-ray unnecessary. Nevertheless grave latent lesions are found with greatest frequency in children with intense tuberculin reactions (Opie and McPhedran). The reaction tends to

diminish somewhat in intensity with the appearance of symptoms and physical signs.

The incidence of the tuberculin reaction in school children in different parts of the United States varies within astonishingly wide limits (Figure I). The percentage of those who react at the age of 15 years may be used as an index of the frequency with which infection has been acquired during earlier childhood. A curve plotted in 5-year periods may be used to estimate this figure. In the larger cities the incidence of the reaction is high. In Philadelphia 77 per cent of white children in public schools and 83 per cent of colored children react to tuberculin (Hetherington, McPhedran, Landis and Opie). In New York 70.4 per cent of children aged 14 years reacted (Barnard, Amberson and Loew); in a suburban district near Boston approximately 52 per cent of children at the age of 15 years reacted (Aronson and Zaks). In certain rural districts in several northern states few children are infected in early childhood. Slater in rural districts of Minnesota found that only 12 per cent of children at the age of 15 years reacted to tuberculin; and Korns in Cattaraugus County of New York found that 16 per cent reacted. In rural districts of southern states (Tennessee, Alabama, Florida and Mississippi), Aronson found a much higher incidence varying from 60 to 70 per cent and wherever comparison was possible, obtained a uniformly higher percentage in negro than in white children. Significant observations have been made by Crouch in Montana. Here only 24.2 per cent of white children reacted to tuberculin at the age of 15 years, whereas of full blood Indian children of the same age, approximately 70.4 per cent reacted.

The figures suggest many questions that can best be answered by further observations similar to those cited. All

we know about immunity against tuberculosis indicates that infection confers some, but limited, resistance to the disease. We have very little direct information about the fate of those who are exposed for the first time during adolescence or early adult life to infection. Anatomical observations demonstrate that such first infection often pursues a rapidly fatal course.

#### SPUTUM EXAMINATION

The commonplace procedure of sputum examination for tubercle bacilli is widely neglected as a public health procedure for the discovery of those who are disseminating the disease. Lack of the meager laboratory facilities required to make numerous sputum examinations or the inaccessibility of laboratory facilities, especially in rural communities, is sometimes responsible for this neglect. The physician who suspects diphtheria recognizes the urgent need of bacteriological examination but is not infrequently apathetic concerning the search for tubercle bacilli when tuberculosis is suspected.

Experience at the Henry Phipps Institute during the last 8 years has shown that children and adults in families of which some member suffers or has suffered from tuberculosis with sputum containing tubercle bacilli are almost invariably infected, latent lesions are advanced, and manifest disease frequent, whereas in families of which a member has tuberculosis with sputum negative, by the usual method of examination, tuberculous infections are often little more frequent or severe than in families with no contact with tuberculosis, and manifest tuberculosis seldom makes its appearance. From the standpoint of public health the separation of pulmonary tuberculosis disseminating tubercle bacilli and that with no tubercle bacilli in the sputum is essential.

Municipal registration of tuberculosis,

grossly imperfect as it is, and the experience of dispensaries such as that of the Henry Phipps Institute demonstrate very clearly that a large part of those with open tuberculosis still remain in their homes and die in contact with their families, infecting a new generation by years of exposure to contagion. We are in considerable part consoled by the thought that the death rate from the disease, still enormous, is less than formerly.

From the standpoint of the patient, frequently repeated sputum examination has much value, for if tubercle bacilli are present in the sputum there is imminent danger of pulmonary dissemination by way of the bronchi. Disappearance of tubercle bacilli from the sputum is significant evidence of improvement. Patients visiting a physician or attending a dispensary should be instructed concerning the value to themselves of sputum examination. They should realize that their physician can better measure the progress of their disease if they bring a specimen of sputum when obtainable at each visit. When sputum is obtainable it should be examined for tubercle bacilli at least once every month. Sputum examination is an index of the danger to which the patient and those about him are exposed.

#### CARE OF SCHOOL CHILDREN WITH ADVANCED TUBERCULOUS INFECTION OF THE LUNGS

The information recently accumulated concerning the occurrence of grave latent lesions and manifest tuberculosis in school children is obviously applicable to the control of the disease. The children who are known to be living in contact with persons disseminating tubercle bacilli are in greatest danger. Since it has proved impossible to discover and register a large part of those who suffer with open tuberculosis, contact of school children

with the disease will often escape detection. Nevertheless, were it feasible for municipal bureaus for registration of tuberculosis to coöperate with the medical inspection of school children many pupils living in contact with the disease could be brought under observation and prophylactic care.

Routine examination of school children by physicians adequately trained to employ available technical methods will reveal a large part of those who suffer with early manifest disease or progressive latent infection. This is expensive, and the interpretation of X-ray films to be effective requires intimate knowledge of the clinical course and pathogenesis of tuberculosis. Hence in the present state of our knowledge of the subject it should be employed with the double purpose of discovering children with grave infection and of obtaining new information that will aid in retarding the progress of discoverable infection. Ability to recognize potential disease has been greatly increased, but as yet no material progress has been made in developing those administrative procedures which are needed to put school children with obvious tuberculosis under conditions favorable to their recovery.

Four groups of children come under consideration:

I. *Children with latent tuberculous infection indicated by tuberculin reaction alone or tuberculin reaction in association with roentgenographically demonstrable lesions that experience has shown are healed or healing, and will not develop into clinically manifest tuberculosis*—This group with lesions already defined includes a considerable part of all school children. Their infection does not threaten their health.

II. *Children with demonstrable latent infection of the parenchyma of the lung*—I have attempted to define our knowledge of the potential significance of the various pulmonary lesions that

are recognizable by roentgenographic methods, but this knowledge is still inadequate and further experience extended throughout the childhood and early adult life of many children is needed. Children with these advanced latent lesions should receive such care as will insure them against further progress of their infection. Machinery for the care of these cases, mainly open air schools, summer camps and preventoria\* are available and are receiving considerable support, but their medical administration with few exceptions is wholly inadequate for the prophylactic control of tuberculous infection. Whenever latent infiltrating lesions of the lung are recognizable, repeated X-ray examination to determine if the infection is progressive becomes an essential part of any effort to check the infection.

III. *School children presumably well enough to attend school who by routine roentgenographic and physical examination are found to have clinically manifest tuberculosis*—In these children grave tuberculous lesions of the lungs are discovered by roentgenographic examination, and subsequent questioning or physical examination reveals symptoms or physical signs of tuberculosis. They are often well nourished and usually show no diminution of

weight (Hetherington). No grave impairment of health is suspected by parents, teachers, or medical inspector of the school. Unfortunately it is often difficult to convince the family physician that the child has pulmonary tuberculosis. When cough or significant physical signs accompany roentgenographic evidence of pulmonary tuberculosis, the need of sanatorium care or its equivalent is obvious.

IV. *Children whose health has been conspicuously impaired by pulmonary tuberculosis*—Children who are brought by their parents to a physician or referred by their teacher to the school medical inspector because they suffer with cough, loss of weight, fever, or other symptoms found to be referable to tuberculous lesions of the lung, have in popular phrase "come down" with the disease. In such cases pulmonary tuberculosis is usually well advanced and a grave menace to life.

It is the usual practice of physicians specially concerned with the treatment of tuberculosis to recommend sanatorium care or its equivalent to patients with clinically manifest tuberculosis, even though the disease is regarded as incipient. The evidence that has been reviewed in this paper demonstrates I believe that children in whom progressive latent infection of the lung substance is demonstrable by repeated roentgenological examination should be treated as though they had manifest disease and receive the same care. The small number of children with massive caseous tuberculosis of tracheobronchial lymph nodes should be included in the same group.

Observations made in Philadelphia, obviously applicable with exactness only to the children who were examined, showed that latent infiltrating pulmonary lesions of childhood type occurred in 1.2 per cent of children between the ages of 5 and 9 years (inclu-

\* An open air school was first established at Charlottenburg near Berlin in 1904. It may be assumed that access to fresh air has been regarded as a symbol for all the agencies that are adapted to promote child health and control the progress of an infection such as tuberculosis. The establishment of these schools and school classes has been widespread. In 1926 the Elizabeth McCormick Memorial Fund had recorded 1,026 open air schools for 32,064 pupils distributed among 245 cities of this country. The figures are now doubtless considerably larger.

Preventoria which provide continuous maintenance have, as the name implies, a similar though often ill defined aim. Records of the National Tuberculosis Association in 1930 showed that there were in this country 32 preventoria with accommodations for 1,600 children and 57 preventorium units attached to sanatoria for 3,400 children. The number up to 2 years ago at least was increasing rapidly, and financial support for institutions of this kind was evidently available.



sive), 1 per cent in those from 10 to 14 years, and 0.2 per cent in those from 15 to 19 years. These lesions occur in great part in children of the elementary schools. They usually pursue a benign course but are not negligible. Open air classes with a régime adapted to insure adequate nourishment and freedom from mental and bodily fatigue give promise of controlling these lesions, provided that medical service and technical facilities are available to determine as accurately as possible the progress of tuberculous infection.

Among high school children the apical lesions that are recognizable tend to pursue a less favorable course (see Table II). In Philadelphia latent pulmonary tuberculosis of adult type was found in 0.5 per cent of children between 10 and 14 years of age, and in 1 per cent of children between the ages of 15 and 19 years.

The school régime adapted to protect pupils of the elementary school from further progress of grave latent tuberculosis is evidently not equally applicable to the older children who attend high schools. Their assignment to classes with specially arranged schedules presents many difficulties. Nevertheless should their progress in the school be subordinated to the immanent demands of their health, it is possible to diminish their hours of work by limiting the number of their courses, to provide periods of rest, to avoid fatigue, and to insure adequate nutrition. Continuous medical supervision and periodic physical and roentgenological examination are of primary importance. When medical examination demonstrates clinically manifest disease, or roentgenographs disclose progress of the lesion, the child should be withdrawn from school and

receive sanatorium treatment or what is regarded as the equivalent of that.

The adequate care of high school pupils with latent tuberculous lesions of the lung presents many difficulties to the school administration. Since the health of these pupils is not obviously undermined, pupils, parents, and not infrequently their family physician, may be earnestly opposed to measures that will retard the child's progress in the school. The administrative officers of the school and other teachers find many difficulties in modifying the number and arrangement of courses to meet the needs of pupils with potential disability. The care of these adolescent children moreover requires space and facilities for rest often not readily available. Furthermore latent tuberculosis of adult type is discovered during the period of adolescence and beginning adult life with increasing frequency as age advances, and is often first recognizable when the pupil is approaching the end of the high school course. In such instances school medical inspection will have accomplished the important function of recognizing potential disease but subsequent care must be assigned to other agencies.

#### CONCLUSIONS

With the aid of adequate technical facilities, grave tuberculous infection can be recognized in a small percentage, constituting a very large number, of school children. The severity of the lesions that can be found in children whose health is not obviously impaired demonstrates the need of medical care directed to control the further progress of infection. Medical care will be ineffective unless it is coördinated with a school régime adapted to the same end.

# Tuberculosis of Bovine Origin\*

MAZYCK P. RAVENEL, M.D., F.A.P.H.A. (*Life Member*)

*University of Missouri, Columbia, Mo.*

SOME 10 years ago I took occasion to point out the injury which had arisen to this Association through specialism. The reference at that time was chiefly to membership, since many special societies have arisen which duplicate the work done in our sections, and it is but natural that specialists should seek membership in the particular societies devoted to their branch.

I now wish to point out another injury which has arisen from the same cause. One finds in the transactions of our earlier meetings many papers on tuberculosis, but for some years, very few have been written on this subject for our Association. It is true that we have dealt extensively and repeatedly with milk, and have a standing committee for the study of this food product. It is true that we have had a number of discussions on pasteurization, and to a certain extent tuberculosis has been considered in these various reports. Recent studies in this country, England, and Canada, have forced me to the conclusion that we have not been sufficiently active in regard to tuberculosis and that it is time for this Association to take up the matter more actively, especially as regards the transmission of bovine tuberculosis to human beings. I may point out that while the death rate from tuberculosis for 1931 was 57 per 100,000, just a third of what it was for

1904, tuberculosis still leads as a cause of death during the prime of life—from 15 to 45 years of age—and shows a marked increase in young unmarried women, the cause of which is not entirely evident.

The subject of bovine tuberculosis was a matter of hot discussion for some years following Koch's address before the London Congress on Tuberculosis in 1901, but for some years little has been heard concerning it, except from our Bureau of Animal Industry, to the officers of which all praise must be given for their splendid work.

In April, 1932, we had the report of a committee of 60 appointed by the Peoples' League of Health in England,<sup>1</sup> a league which was set in motion by Olga Nethersole, the great actress. It showed that 40 per cent of the cows in Great Britain are infected with tuberculosis, while 6.7 per cent of the samples of market milk from various parts of the country contained living bovine tubercle bacilli, and further, that 2,000 deaths occurred annually from this cause, largely in children, while 4,000 new cases of the disease developed, and pointed out that since glandular tuberculosis was not reported, this latter figure was considerably below the facts. During the same month the report of the Committee on Prevention and Research of the International Society for Crippled Children<sup>2</sup> stated that tuberculosis stood second only to infantile paralysis as a crippling disease, that from 10 to 15 per cent of the cases of bone and joint tuberculosis are of bovine origin, and that of children

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

suffering from tuberculosis from 0 to 5 years of age, 21 per cent, and of those 5 to 16 years, 26 per cent derived their infection from the bovine germ. At the University of Toronto, Dr. R. M. Price<sup>3, 4</sup> has been typing cultures from cases of tuberculosis, and has found that of 340 patients studied, 13 per cent were infected from bovine sources. This work afforded a most striking demonstration of the value of pasteurization, since in Toronto, where the milk supply is pasteurized, not a single case of bovine infection was found, while in the Province of Ontario the figures just stated prevailed.

What do the figures presented mean to us in the United States? It is freely confessed that we have no grounds for an estimate even approximately correct, but if the British figures of 1 death for every 2 cases—which is manifestly short of the truth—holds, it indicates a death rate from bovine tuberculosis for which we should blush, and to prevent which every effort should be made. I have elsewhere given an estimate of 3,500 to 4,000 deaths, based on the annual death rate for 5 years of 7,000 children, but further study has convinced me that my figures were too high. Of the cases of bone and joint tuberculosis, 6 per cent are fatal.

So much for the facts. Along what lines can our Association show activity with benefit? The matter of the eradication of bovine tuberculosis is being competently handled by our Bureau of Animal Industry, and the reduction in the disease passes what most of us believed possible only a very few years ago. This part of the work can well be left to this agency and to the veterinary profession, though we should recognize their work and aid it whenever and wherever possible. We are much better off in respect to infected cattle than are the English. The percentage of infected cattle in this country is estimated at 1.9, and of tuberculosis

of the udder at 0.1, but among dairy herds, the figures run higher, though I have been unable to obtain the exact percentage from the Bureau of Animal Industry. Pasteurization of milk, which was formerly urged largely on account of the danger of bovine tuberculosis, is being pushed by our Association and by competent health officers throughout the country for other reasons also, so that practically all of our large cities have a safe milk supply through this process. This work must be continued until pasteurization is the rule in small cities and towns, as there is some reason to believe that tuberculosis is on the increase in rural districts.

Directly connected with the prevention of tuberculosis is the matter of nutrition. It is universally conceded that milk is an essential food for infants and children, and the best results shown in the fight against tuberculosis came when the consumption of milk was greatest. Since 1929, the amount of milk consumed has been decreasing. One estimate places this decrease at 20 per cent. The two products, the use of which show the greatest falling off, are whole milk and ice cream. Here is a field in which every member of our Association, whatever his special line, can take a part by teaching that portion of the public with whom he comes in contact the benefits of milk as a food and the necessity of its use for growing children.

While our Association does not go into treatment of disease, we recognize that every case of contagious disease which is well cared for wipes out a focus of infection. For tuberculosis, more than for any other single disease, early diagnosis and the prompt institution of treatment are most important for recovery as well as prevention. A recent survey of our medical colleges shows that only 19, or 29.7 per cent, have special departments for teaching tuber-

culosis; 9, or 14.1 per cent, divide the work between a specialist and the internist; while 33, or 51.6 per cent, have specialists for teaching without distinct departments for the work. Our Committee on Training and Personnel might well, it seems to me, lay stress on the study of tuberculosis. Our public nurses have many opportunities for putting such knowledge into effect, and every health officer comes up against the problem almost daily.

Note: Since the above was written, the *Special Report Series No. 172* of the English Medical Research Council has appeared and

been reviewed in the *London Lancet* for October 15, 1932.

From 1,800 consecutive autopsies at the Glasgow Royal Hospital from 1924 to 1931, in which the type of tubercle bacilli isolated at autopsy, both from those dead of tuberculosis, as well as from other causes, and cases of surgical tuberculosis still alive, Dr. Blacklock concludes that 37 per cent of the bacilli were of the bovine strain. This makes him think that bovine tuberculosis is even more common in Scotland than in England, or on the continent.

#### REFERENCES

1. The Peoples' League of Health, 12 Stratford Place, London.
2. Rochester, N. Y., Apr. 18, 1932.
3. *Am. Rev. Tuberc.*, Mar. 1932.
4. Harris, R. I., Milk-Borne Tuberculosis, *Canad. Pub. Health J.*, Jan., 1932.

## Activities and Trends in the Laboratory Field\*

GEORGE W. McCOY, M.D., F.A.P.H.A.

*Director, National Institute of Health, U. S. Public Health Service,  
Washington, D. C.*

THE invitation to attempt an interpretation of the activities and trends in research work on behalf of the Laboratory Section was accepted with some reluctance. This reluctance sprang chiefly from a feeling of perplexity as to what might be presented to you, and I beg of you to note that the subject is not "Advances and Achievements in the laboratory field." Perhaps it always has been so, but just now seems to be a time of more than ordinary questioning of old views and of what were thought to be well established facts. Indeed, some of the more progressive workers in the field of bacteriology are subscribing to a new creed in which "I believe"

becomes "I do not believe." To these the postulates of Koch, long regarded as the very foundation of all that we regarded as well established, become of no more significance than an outworn slogan of the last political campaign.

I am prompted to listen, at least sympathetically, and perhaps respectfully, to the apostles of the newer faith by the recollection of the fact that advocates of the revolutionary always travel a hard road—witness especially Semmelweiss. For the benefit of those who may not be especially interested in medical history, I should like to say that Semmelweiss was a Vienna physician who was much disturbed by the maternity mortality in a great lying-in hospital. He had one of the earliest conceptions of what we would now call an "epidemiological study," and on the

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

basis of his observations he made a suggestion that led to his scientific crucifixion—and what was the suggestion that had this disastrous personal result? It was only that medical attendants of parturient women should not go practically directly from the performance of an autopsy to attending at a childbirth.

I have a feeling of suspicion that this progressive view may turn out to be more nearly right than many of us, perhaps the majority, are willing to concede. I make no pretense to be in a position to express any opinion on the merits of these new contentions and perhaps my suspicions that they will prove sound arises from a recognition of the fact that, so far as concerns this country, like prohibition and woman suffrage, they have come out of the West. Some of the progressives modestly offer a new interpretation of certain observed facts regarding them as stages in vital histories of readily visible forms—note how neatly I avoid the expression “life cycles,” and they see further in these life histories possible explanations of such mysteries as the why of the waxing and of the waning of epidemics.

Most of us are ready to accept variation among bacteria as applied to such readily demonstrated facts as colony types, and to acknowledge their great significance; but we are likely to have to go much beyond this. It is no fantastic possibility to see in some of the newer work an explanation of the hitherto mysterious rise of epidemics that have appeared to be spontaneous in their development. Such a view would require us to reconsider much that we have treasured in the shape of attributing outbreaks to “missed cases” and “carriers.” Instead, they may be looked upon as stages in the history of the infecting agent seeking to make for itself a place in the sun.

We have indeed traveled far—as one writer recently expressed it, “from the

static bacteriology of Lister and Ehrlich and Koch.” Medical bacteriology especially has been accused of being a millstone around the neck of the worker in fundamental bacteriological research. Possibly so, but let us console ourselves with the thought that even a millstone has a useful purpose to serve, though perhaps not when draped around the cervical region of a research worker. Perhaps the medical bacteriologist has centered his thought too closely on the practical application of the fruits of his investigations; but when one appraises the benefits that have come from this, much should be forgiven.

One of the outstanding facts that has impressed me in recent years has been the rich harvest to be garnered from the reworking of old fields. Let me illustrate: Up to perhaps a half dozen years ago we felt quite comfortable about our knowledge of yellow fever. I am sure that nearly everyone would have agreed that if there existed any one subject on which further work was not required, that was yellow fever. In spite of this, further work was undertaken, and on the basis of the more recent observations new methods of the transfer of the infection have been noted, new species of insect vectors proved, and an exact scientific method evolved for the recognition of those who are immune.

Another outstanding example is to be found in typhus. Here, too, we thought that our knowledge was rather complete though, as in yellow fever, we had not grown the causative organism. Certain outstanding differences in epidemiology between endemic typhus as observed in this country and epidemic typhus in other parts of the world, led to a search for new vectors and new reservoirs. This work has been successful in showing the rat to be a reservoir for the infection, and the flea to be a vector, and the evidence indicates that

out of the evil combination we have secured a knowledge of endemic foci and a suggestion to explain the prevalence of the disease in epidemic form.

Three years ago psittacosis was considered a rare disease of passing interest only. Following its rather spectacular spread over the world in 1929, we have learned that its etiological agent was not the organism that had hitherto been regarded as the cause. Infection of laboratory workers demonstrated the dangers involved in the study of the disease. New methods of study have to a large extent eliminated this risk. We have learned that probably we have been missing many cases, a point of importance to health officers and to physicians generally.

Relating to the phase of progress just described I want to mention the searching of our souls that is now going on, chiefly with respect to the exact usefulness of what have been regarded as established and tried agents and practices. The clinician points an accusing finger at the research worker and demands to know why *antimeningococcus* serum is disappointing him. He has been led to expect a death rate of somewhere in the neighborhood of 15 or 20 per cent, but in the extensive prevalence of meningitis of a few years ago in the West and Mid-west the death rate was nearer 50 per cent, and on the wrong side of 50 at that. If one goes to the trouble of studying the curve of meningitis fatality over a long period of years, he will find that it has been rising rather steadily for a couple of decades.

The last subject I mention under this head I approach with considerable hesitancy but, after all, what I have to say has been said before, so I suppose it is safe to remark that our sheet anchor, diphtheria antitoxin, is coming into the limelight for a new appraisal. It is no secret abroad that for the last 6 or 7 years parts of Europe have been having a type of diphtheria that is not

very amenable to antitoxin treatment. The time honored alibis of inadequate dosage and of delay in beginning the treatment do not appear to be so satisfactory as they have been in the past. There is nothing to indicate that a difference in immunological properties of either toxin or antitoxin accounts for the disappointing results, nor is there any other satisfactory explanation.

I might cite other examples in which the clinician has grievances growing out of his disappointments, but the two mentioned will suffice.

The public health administrative officer is rather pointedly inquiring as to why typhoid vaccine sometimes fails to prevent typhoid fever, and the same goes for rabies vaccine.

In this connection, I would like to point to Park's study of the clinical use of poliomyelitis convalescent serum in the treatment of that disease as a model of excellence. Without Park's work, which I think showed conclusively the want of value of the serum, we would have gone on for an indefinite time nourishing the delusion that convalescent serum was a valuable therapeutic agent in poliomyelitis.

Perhaps all of these examples demonstrate the necessity of epidemiological and of statistical work in support of laboratory findings.

We have had to concern ourselves too in recent years with essential complications of our prophylactic agents. The epidemiological and the laboratory investigations of tetanus following smallpox vaccination gave us such readily applicable means of prevention that this complication practically has ceased to trouble us. But scarcely had tetanus passed out of the picture when encephalitis took its place. It has been of rather minor importance in the United States but abroad it has had to be taken more seriously. Everywhere that this distressing complication of vaccination has made its appearance

there has been advanced to explain it a relationship of coincidence between the complication and the prophylactic procedure; in other words, an ordinary case of lethargic encephalitis had chanced to afflict someone recently vaccinated against smallpox. The accumulation of hard, cold facts has made it necessary to revise this comforting view and, so far as I know, no one now denies that post-vaccination encephalitis is a direct, though rarely occurring, sequel of vaccination.

Perhaps it is hardly necessary for me to say that I am an orthodox believer in smallpox vaccination, but I am willing to admit that rarely it is the cause of serious complications. These do not occur frequently enough to make it necessary to modify the doctrine of general vaccination. But the fact that they do occur is sufficient to stimulate us to take every means at our disposal to prevent them. Indeed, with respect to encephalitis, the studies already made have shown that, for all practical purposes, it may be avoided by the practice of vaccinating in the first year of life. We are beginning to be more circumspect in the use of prophylactic serums on account of the hazard of serum sickness or the more serious results of the administration of foreign proteins.

Evidence of the high esteem in which the laboratory worker is held by his colleagues in clinical and in administrative fields is to be found in the readiness with which his discoveries are received, and the promptness with which they are put to practical use. I am not one of those who subscribe to the doctrine that the results of research do not find prompt adoption. My complaint would be rather that the research worker often is not given time enough to perfect his material or his procedure. I happen to sit at a desk to which come many requests as to where materials still in the experimental stage may be

secured for public health application. In these days of widespread publicity of scientific information and of alert clinicians and administrative officers, one is likely to hear first of some advance in sciences relating to public health by a request that the material or the method be made available for general use. This is sometimes rather embarrassing to the research worker, and I have the suggestion to make that embarrassment might be avoided by rather strict deliberateness in passing out to the world the results of research. Indeed, I do not know of any substantial advance that would be sacrificed if the research worker would follow Jenner's example and refrain from publicity until his prophylactic or therapeutic measure had been well tried out. I fear that many of us are tending, too frequently, to announce publicly the results of immature and of incompleated observations. How many "preliminary notes" are published in our literature without any subsequent articles appearing?

A source of embarrassment in dealing with my subject lies in the overlapping of the frontiers of chemistry and of physics and of the biological sciences including bacteriology. Lest I be thought unappreciative of work in fields foreign to my own, I may say that in my own judgment the greatest advances in the field of medicine, including public health, since the discovery of anesthesia, have been made by Pasteur, a chemist, and Roentgen, a physicist. In respect to chemistry as applied to the field in which we are interested, perhaps more progress has been made in studies on the very minute. Witness studies showing the influence of extremely small amounts of heavy metals on metabolism with special reference to nutrition. Perhaps equally great progress has been made and is being made in the isolation and in the study, in pure state, of the group

of substances we know as vitamins. We are beginning to look to chemistry for advances in the studies of substances responsible for the activity of the so-called ductless glands. Chemistry as applied to bacteriology also is opening fields that give promise of much in the future.

Anyone may see that one of the trends is toward the description of new clinical entities—rather, it would be more accurate to say, the identification of clinical entities that have been with us for a long time, as tularemia, undulant fever, the eastern type of spotted fever, and psittacosis. Laboratory studies have made the recognition of all of these possible and have gone a long way toward making their prevention or control feasible.

Perhaps the most striking activity of recent years has been in the field that deals with the viruses. It is gratifying to observe the progress we have made in this field. We have come to realize that we can learn a great deal about an infectious disease without the cultivation of the etiological agent outside the animal body. We have not certainly cultivated the organisms of smallpox, of psittacosis, and of members of the typhus-spotted fever group; yet we have enough useful information to enable us to control them as well as, or better than, we do many diseases the etiological agents of which have been grown.

I regret that I am not able to bring to you, in behalf of laboratory workers, any noteworthy advance in relation to the diseases that bulk so large in mortality and morbidity. Cancer, tuberculosis, pneumonia, nephritis, and heart disease continue to take their toll in spite of our best efforts to learn how to prevent or how to cure them. Perhaps the new orientation now going on in biologic research may lead us to a better understanding of these and of many other diseases.

Let me now sum up my conception of activities and trends in the laboratory field: We are in a new era in which we must pay more attention to what, for want of a better expression, we may call *intrinsic changes in micro-organisms*. We are finding fruitful fields in the re-study of problems that we thought to have been satisfactorily solved by the pioneers in research work. We are reappraising agents and procedures, giving more attention to clinical and field observations than in the past. We are becoming more critical in the use of prophylactic and therapeutic agents, lest in any individual case we do harm. We are identifying new clinical entities and find that this is not necessarily contingent on cultivation of the causative organism. Finally, we are looking to the general biologist, the physicist, and the chemist for an increasing measure of help in the study of our problems.



# Current Preoccupations of Health Officers.\*

HUNTINGTON WILLIAMS, M.D., DR.P.H., F.A.P.H.A. (*Life Member*)  
*Commissioner of Health, Baltimore, Md.*

THE most important matters before health officers at present seem to group themselves under three main headings: (1) the paramount problem of budgets in this period of economic uncertainty; (2) the need for careful evaluation of public health practices for the purpose of eliminating less profitable services and strengthening those of major health importance; and (3) a *practical* program which will bring the members of the medical profession into active participation in the community-wide application of personal hygiene. Please note the word *practical*, for there has been a lot of theory and lip-service in this matter.

A consideration of the first and second of these major preoccupations of the health officer might well go hand in hand, for during the golden decade from 1920 to 1930 health department budgets were almost constantly on the increase. Much of what was asked for was appropriated, and there was little or no necessity for pruning or eliminating wasteful practices or age-old inheritances that did not produce results commensurate with their costs. City, county, and state health budgets have recently been cut, in some instances by 20 per cent or more. To be compelled to go through such an experience may, I believe, be an intensely profitable one for a health department. The gains

resulting from such budget cutting, if not continuous or excessive, are sometimes unexpectedly helpful.

A health officer faced with a major appropriation reduction at first feels that it simply cannot be done. After the first shock is over, he sets himself resolutely to the task of pruning, which proves in the end to be a test of himself, of the department, and of its relationship to the governmental administration. Happy is the man at such a time who has the whole-hearted support of his superior officers and their genuine interest in preserving a fundamentally sound and efficient public health service. He is either free or not free to make the adjustment in the best interests of the community. He is either instructed to make the slashes himself or it is done for him by the budget authorities. To submit health department budget requests for 1933 with slight reductions from the figures for 1932, in my estimation, is a wise procedure because of the present financial situation that makes necessary every possible retrenchment in governmental expenditure. Within the limits of public safety, no health department can now afford to ignore the importance of this necessity.

Reductions in health department appropriations, where they have occurred, have made imperative the careful evaluation of public health practices in order that services which were eliminated or reduced in volume might not be those producing a major health return. Not only is it a question of what

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

activities should go by the board, but more difficult yet, which members of the staff can best be spared. Problems of civil service and tenure of office for personnel arise to plague the health officer's midnight hours that should be given to restful sleep.

Fortunate are the health departments which have already been able to turn their major attention toward modern public health practice, which centers in the personal health of the individual citizen. In many places there are dead weights that must be lifted from the health machinery, weights that have been inherited from a program that often centered in complaint work and nuisance abatement.

The splendid services of protecting city water and milk supplies and providing proper community sewage disposal have become foundation stones which are now accepted and on which future progress in public health will be built. Nothing must interfere with their continued and efficient functioning but primary attention should now be focused on personal hygiene. This will make available on a large scale known methods of health protection for the individual. The wide application of such personal hygiene is now recognized as essential for any advance in civic health. The thoughtful health officer is preoccupied in determining which of the inherited services of the past he can profitably eliminate or reduce and what other activities he must embrace or strengthen if he is to avoid the risks of stagnation and well founded criticism.

In this change of emphasis many things will come to your mind. The need for better industrial hygiene, which is perhaps the most important of the untilled fields of public health; added emphasis on prevention of illness in the older age groups; increased attention to the mounting death rates for cancer, heart disease, diabetes, and accidental deaths; a new focus on methods

of integrating mental hygiene with the community health service; and back of all, a proper emphasis on the need for public health education in order to bring about the desired results—all these and others come into the picture of evaluating present health practices for the purpose of sound future development.

Leadership in health promotion is the function of a health department. It should organize and coördinate official and nonofficial agencies and make possible a far-reaching health machinery. No health department can do its job along modern lines without the active support of the medical profession. This support is needed and is expected by up-to-date health officers. Such work as the eradication of diphtheria, the reduction of the venereal diseases, and the adequate care of expectant mothers and of young children must rest largely in the hands of the practising physicians. A health department can do much to teach the public to seek such keep-well services from the medical profession. It should never hope to have a staff or clinic service large enough to carry on the needed volume of work itself. The practising physicians are the outposts on the firing line in the modern battle for better health and they should be considered by all as veritable public health agents.

This brings me to the third major preoccupation of the health officer and that is the establishment of practical methods for bringing the members of the medical profession into a more active participation in the community-wide program of personal hygiene. There has been a great deal of theory and lip-service in this matter during recent years. Nearly everyone recognizes the desirability of having the practising physicians feel that they are playing a real part in the modern health crusade. As a matter of fact, they are doing just that in a large portion of their private practice day by day, but

they have received very little recognition for their contribution. In certain places where community sanitation, including water and milk control, sewage disposal, and nuisance abatement vie with communicable disease control in occupying the major attention of the health administrator, the need for a more closely knit working arrangement with the local medical profession has not received due consideration.

Until recently some leaders in the medical profession have felt that public health was distinct and apart from private and personal hygiene and that the latter should be left entirely in the hands of the medical profession. Rather naturally those who are engaged in the great tasks of social welfare are somewhat impatient with any delay in the application of known preventive measures among large groups of citizens who are not able to take the initiative, or who will not, in the health protection of their own families. The fact remains that future advances in public health will be made largely in the realms of personal hygiene. The major portion of this gigantic task, if it be successful, must be performed by the rank and file of family physicians. There can be no more vital problems confronting the medical profession and public health authorities than their mutual relationships and fields of activity.

Sir Arthur Newsholme has published a valuable discussion<sup>1</sup> on the topic in a recent issue of the *Journal of the American Medical Association* and in his latest volume<sup>2</sup> *Medicine and the State*. Dr. William H. Welch, on the occasion of the celebration of his 80th birthday in Washington, in 1930, referred to this same problem and said:

Something of the lack of adjustment of the average man to rapidly changing social, economic, and political conditions of our complicated modern civilization, may be reflected in a certain temporary maladjustment

between curative medicine and preventive medicine, which should stand in harmonious relations.<sup>3</sup>

The adjustment needed to bring about smooth-running coöperation will perhaps be achieved when medical schools give the proper emphasis in their curricula to the teaching of the practice of preventive medicine; when dispensaries, clinics and health centers serve as foci for postgraduate medical instruction along preventive lines, and when health departments become fully awake to the valuable assistance which they may receive from the medical practitioners who are leaders in their own areas. Medical educators should keep ever before them the dictum of that statesman, Sir George Newman, Chief Medical Officer of the British Ministry of Health, who has said: "The first duty of medicine is not to cure disease, but to prevent it."

I keep thinking of an almost ideal situation where a health officer I once knew served as the chairman of the public health committee of his own county medical society. You may well imagine that cordial relations were almost inevitable in such a hook-up. It does not often occur. This rather dual personality would write himself letters from time to time, from the health department requesting the approval and assistance of the local medical fraternity on a particular health project. In due course of time the letter would be referred to the public health committee and he would send himself a reply assuring the health department of the desire of the local medical profession to do its best to assist in the particular activity under discussion. Some such working basis between health authorities and the medical profession is possible of achievement wherever it is sufficiently desired and where any pre-existing causes for distrust or suspicion have been removed. Many of you know of places where just such satisfactory

relationships have been worked out, by conference, by communication and by a little application from time to time of the Golden Rule.

It is my feeling that health departments must bring to the attention of the medical profession the fact that they, the health departments, are by statute required to do their utmost for the health protection of the public but, at the same time, that they desire to afford to the medical profession every opportunity of participating in the program and advising in the many details that will go to make it successful.

These details affect, in a very genuine way, the activities of workers in all of the sections of the American Public Health Association who are represented here today. After all, the health officer is merely the general family physician for the community who must call in the aid of specialists in the fields of laboratory work, of maternal and child hygiene, of communicable disease control, public health education, nutrition, and many other particular branches of service. In almost every

instance what these specialists would like to see in wide application impinges directly upon the private practice of medicine in any given locality. The Committee on Administrative Practice<sup>1</sup> states that satisfactory public health work requires among other things the support of the medical profession. This support cannot be had merely by wishing for it, but must be earned as a result of careful and unselfish planning.

In closing, may I say that health officers have no right to take themselves too seriously, that like others they must be able to give and take if their work is to succeed. If they are blessed with a lively sense of humor and a good digestion it is almost certain that their major preoccupations will not weigh too heavy upon them.

#### REFERENCES

1. Newsholme, Arthur, M.D., K.C.B. The Relationship of the Private Medical Practitioner to Preventive Medicine, *J. A. M. A.*, 98, 20:1739, 1932.
2. Newsholme, Arthur, M.D., K.C.B. *Medicine and the State*, Williams & Wilkins, Baltimore, 1932.
3. William Henry Welch at Eighty, Milbank Memorial Fund, 1930, p. 41.
4. *Community Health Organization*, Commonwealth Fund, 1932.

## Work in Vital Statistics for Public Health\*

WALTER F. WILLCOX, PH.D., F.A.P.H.A.

*Professor of Economics and Statistics, Cornell University, Ithaca, N. Y.*

WILLIAM FARR, who coined the phrase vital statistics, defined it as "the statistics of health, sickness, diseases, and death." But statistics, the numerical study of groups, can work only with definable, countable units. No such units of health or of

sickness have been established, and one may doubt whether they will be. In his later practice, which has determined English and American usage, Farr passed lightly over the statistics of health and sickness and centered attention upon deaths and causes of death, both of which are countable. While narrowing his definition on one side, he widened it on another by including not only deaths and their

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

causes but also births, marriages, and population, the last being needed to furnish the other term of the system of ratios or rates, death rates, birth rates, marriage rates, which make up vital statistics.

The subject assigned me is the major problems of vital statistics, with the aim of telling other students of public health what we are trying to do in the Vital Statistics Section. Our ultimate aim is, by use of the statistical method, to describe groups of human beings, measure the changes they undergo, and where possible ascertain the causes of those changes. In this description points arise which are of little interest to workers in public health. You might be told, for example, that in the United States the death rate of bachelors between 35 and 44 years of age is more than twice that of married men. If statistics can tell us also that this difference is due in part to a beneficial influence of marriage upon health and not entirely to the influence of marital selection, this descriptive statement would come within our Association's field, but even then it would be more important for biology than for sanitary science. What, then, does vital statistics accomplish for public health?

The aim of the American Public Health Association, as our Section views it, is to increase the degree of health and the amount of life in the American people or some group of them. But as health cannot be measured or counted, the vital statistician turns to measuring the amount of life in a given population, or, more specifically, the amount resulting from a certain number of births. This is found by multiplying the number of persons by the length of an average life. In this way vital statistics provides a marking system by which to gauge the success of the Association and also a goal toward which it should aim.

Until early in the last century students believed that the length of human life, one of our two factors, although greater in the days of the patriarchs, had been fixed in modern times by the fiat of the Almighty and that man himself had no power over it. Just over 100 years ago, Chadwick, in the teeth of the actuaries and out of the evidence they had supplied him, proved statistically that life in England averaged about 8 years longer than it had in the preceding century. He thus gave himself and others an attainable goal and made our Association possible. Neither he nor any later scholar has shown that the longest human life is longer now than formerly, but only that its average length is greater, this average depending mainly on the proportion of children born who reach or nearly reach the limit of age.

From the point of view of the length of life persons may be roughly divided into 3 classes: those who die before reaching the age of 10 years and who have been, economically at least if not otherwise, a burden upon society; those who live through the period of active life which ends perhaps on the average at about the age of 60, and those who die between the ages of 10 and 60. To a statistician the first of these 3 classes appear as failures, the second as successes, the third as partial successes. A comparison between the proportions of these 3 classes furnishes a measure of achievement in the work upon which our Association is engaged.

The death records of Massachusetts began earlier than those of any other state, and so that state has been chosen as an example. In 1930 those who died above the age of 60, the successes, were more than 51 per cent of all deaths; in 1842 they were only 22 per cent; in 88 years the proportion of successes had increased about  $2\frac{1}{2}$  times. The proportion of deaths under 10 years of age, on the other hand, the failures,

was nearly 40 per cent in 1842; in 1930 it was only 13 per cent. The failures fell in 88 years to one-third of the initial proportion.

The statistics of one foreign country, Sweden, deserve a moment's attention because they began in the middle of the 18th century and so enable us to apply the marking system over a period of 175 years, twice as long as the Massachusetts interval. In Sweden, in the middle of the 18th century, the proportion of failures was about one-half. In 1928 it was 12 per cent, only one-fourth, instead of, as in Massachusetts, one-third of what it was at the start. The successes at the start were less than one-fourth and are now more than 58 per cent, and thus they increased, as in Massachusetts, about  $2\frac{1}{2}$  times.

These evidences of progress suggest that our Association's goal is to secure a normal lifetime for every child born by reducing the failures and the partial successes to zero. The goal may never be realized but the progress just demonstrated suggests that it may be further approached—how closely none can tell.

This measurable change illustrated from the statistics of Massachusetts and of Sweden and probably under way in all civilized countries gradually eliminates the influence of natural selection, that is, selection by the premature death of the unadapted, or what

has been called lethal selection. If progress is not to be checked or turned backward it would seem that society must develop other forms of selection, like selection for marriage or for parenthood, to play the rôle filled by lethal selection in uncivilized or semi-civilized groups. Whether that can be done, and if so, how, are questions upon which statistics may some day cast light, but which, at present, it has hardly begun to face.

The practical statistical problems of the immediate future in the field of public health, as I see them, center about so utilizing our resources as to secure the greatest increase in the amount of human life that can be obtained from a given amount of available knowledge, energy, and money.

If we attempted to estimate in dollars the value of human life and its changes in value with age, we would probably conclude that its highest value comes in early adult years. But if life be given a value to be measured only by its amount or length, it would seem to follow that the most valuable lives are those of infants. By saving the life of an infant we add on the average to the sum total of life more years than we can in any other way. If so a reduction of infant mortality is the most effective way of increasing life and postponing death.

# The Public Health Engineer's Work\*

ABEL WOLMAN, F.A.P.H.A. (*Life Member*)

*Chief Engineer, Maryland Department of Health, Baltimore, Md.*

NOT quite a half century ago, the American Public Health Association was holding its Annual Meeting in Washington. A considerable part of its program was then devoted to what we now call "sanitation." Some of the Washington newspapers, in referring to the meetings, spoke of "sanitation" as "a novelty of doubtful utility." It was the same meeting at which a certain Victor C. Vaughan and a George M. Sternberg were awarded the Lomb prizes, the former for a paper on housing for the working classes and the latter for an epoch-making contribution on individual prophylaxis against infectious diseases.

Today, 50 years later, we are asked to take stock of public health engineering, a new name for an old "novelty." I hardly know whether to view it as a decrepit science, as some of our co-workers hint, or as a babe in arms still starting out into virgin public health fields. I choose the latter because I happen to be of cheerful disposition and also an amateur student of historical error in prophecy on the part of newspapers. I believe, with the one-time Secretary of the Maryland Department of Health, who had struggled for years for decent water supplies and sewerage systems, that "sanitarians are certainly harmless; and they may be useful."

Even if the economic system is on its last legs and the machine age is totter-

ing, the engineers assembled in Washington this week give no indication of being concerned about it. For years they have accustomed themselves to the task of adjusting environment to the advantage of man. If supplying safe drinking water, removing wastes, protecting milk and other foods, has made it possible for people to live in crowded cities, the engineer is now busy devising ways and means, with the instruction and aid of other workers in the public health field, to eliminate those disabilities which have resulted from this same urbanization.

His field has undergone considerable change in the last 50 years, but his objective, the control of environment for the promotion of health and welfare, has remained rigidly the same.

The improvement of water supply, sewerage, plumbing, and garbage disposal to forestall the current "accidents" of disease, such as typhoid, cholera and dysentery, was the major objective of the sanitarian. The fruits of these accomplishments are too well known to need repetition. Their continued supervision and extension are, likewise, obvious tasks of profound importance for the future as our populations extend in area and in numbers.

The increasing competition for water supply by growing cities is occupying more and more of the attention of engineers. Vast legal battles for the life streams of many millions have been waged during the past 10 years. The attempt to avoid overwhelming sewage pollution of major streams has run parallel with the struggle for water.

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

Even today the sewage of well over 80 per cent of the urban population of this country receives no treatment.

Some people like to believe that the public health importance of water supply and sewerage has dwindled in the last 20 years, but the engineer sees each day an increasing problem in providing satisfactory sanitary facilities for all the people. The mechanics of procedure has been much developed since 1890, but the program of action is no less pressing today than then. Although preventable death is still a municipal crime, this homicide rate is still too high.

To the current technical and financial difficulties in this field, has been added the increased esthetic demand of the consumer, who no longer wants a water supply which has merely the superficial characteristic of liquidity. Instead he demands safety, brilliant clarity, low temperature, absence of taste, odor, and color, freedom of corrosiveness, and soft water for industry and the housewife.

The engineer now presumes to meet these requirements. He coagulates water with many old and new chemicals; he filters through sand, coal or zeolite; he pre-chlorinates, super-chlorinates, post-chlorinates and de-chlorinates; he adds lime to raise the pH and sulphuric acid to lower it; he adds lime to precipitate salts and carbon dioxide to dissolve them, he aerates to remove gases or to put them back in circulation; he adds activated carbon, bleaching clays, copper sulphate, and chlorine to remove tastes and odors. No self-respecting water organism can stand the routine assault on his vitality. Perhaps the job is finished, but no water works engineer knows it.

The financial difficulties in the water supply, sewage and refuse fields are more pressing today than ever before and real concern for extending adequate

sanitary facilities to the public is apparent. We have not yet placed these sanitary requirements foremost in municipal economy and have much to learn from abroad. Perhaps, when we can parallel the experience of the City Council of Berlin, of which Rudolph Virchow was a member for over 30 years, we may preserve the budgets for public health. But who can visualize Haven Emerson on the Board of Aldermen of New York City, Wilinsky on the City Council of Boston, or Vaughan on the City Council of Detroit?

As if to remind us that our task in this field is never done, some 15 years ago water was incriminated in the case of mottled enamel of children's teeth. On this week's program, fluorine in drinking water and mottled enamel are added to the engineer's discussions. Evidence of endemic occurrence of mottled enamel in the teeth of children in North and South America, Africa, China, and Japan is now abundant. The cause of this serious defect in children is now reasonably demonstrated to be due to excessive amounts of fluorine in water. A new technic for the detection of fluorine has been devised and this new public health engineering problem appears before you.

Recent analyses of 110 public and 75 private water supplies in Arizona show fluoride contents ranging from 0 to 12.6 p.p.m. The survey disclosed 45 towns or rural districts in Arizona in which mottled enamel of teeth is endemic. Severe incidence of the same tooth deficiency has been reported from Arkansas, Kansas, Idaho, Oregon, New Mexico, and South Carolina. Concentrations of fluorides above 2.7 p.p.m. have been found to be definitely toxic in water supply. Abandoning a public water supply to prevent the disability is not always easy or possible. Methods of treatment for the removal of toxic concentrations of fluorides,



are, therefore, now under investigation.

The engineer is increasingly concerned, however, not only with the prevention or elimination of disease "accidents," but with the more difficult job of raising the "physiological tone" of the people. The assaults of a mechanized environment upon the helpless public have forced public health action, even before the physiological bases for action have been fully clarified. In these instances, as in the earlier attack on polluted water, corrective measures for disabilities have been introduced in advance of their scientific proof. Dr. Welch pointed out, in 1897, that "it is fortunate that those who instituted the first public sanitary measures did not wait to find a thoroughly scientific basis for them."

In the same way, the engineer is now called upon to defend the individual against noise, odors, vibrations, darkness, and stagnation, although the exact physiological bases of attack against these concomitants of the machine age are still indefinite. The instinct of man to revolt against them forces action.

How to recapture the heritage of sunlight for man! How to provide a natural and beneficial atmosphere! What are the modern criteria of sane ventilation? How can we eliminate smoke so that the sun's beneficent rays may once more reach our children? What does the turmoil of the modern city do to us? How can we measure the amount and quality of noise and its physiological effects? How can we eliminate it? What are the deleterious effects of industrial gases and how can they be corrected and removed? What are the hazards in swimming pools and how can they be circumscribed? How can we keep our streams clean, so that the joys of rippling brooks may once more refresh our eyes?

These are the new problems of our group. They require a new terminology and a new set of measuring devices.

The engineers are busy attempting to measure the difference between the noises of opera and of "uproar." When Rosa Ponselle does a 77 on the new decibel scale of noise measurement, does it hurt us as much as or more than when the New York or Chicago riveter reaches a 77? How much difference is there between Rudy Vallee's record of 75 and the 60 of the flat wheeled street car? One recent technical reporter justly inquires, "Is it right for Gigli of the Metropolitan to do a 93, while the harbor tug blasts out a mere 73 and gets into difficulty with the Noise Abatement Commission?"

Once upon a time, before the canyons of our great cities were built, it was unnecessary to recapture sunlight for our children. It was theirs by natural right. This week in Washington, the engineer passes from the decibel of noise to the actinic ray of sunshine as blithely as he once shifted from the *B. coli* to the B. O. D. test.

Strange as it may seem, although Greta Garbo and Marlene Dietrich know just how far they may tempt the erythemogenic or tanning power of sunlight and still keep their contracts, it seems that the scientists now in session want a more objective measure of sunlight effect. One of the reasons for the demand is the ever increasing number of ultra-violet radiators sold for healing purposes. Getting the sunlight artificially, however, is only part of the task. The profession is measuring at first hand the loss of actinic sunshine in the modern city, effect of smoke, and the ultimate means of recovering some of the values of sunlight.

Indoors, the problems of light, heat, and ventilation are likewise pressing, and the groundwork for understanding is being laid. A large part of this week's program is devoted to the discussion of measuring, conserving, and supplementing the natural and artificial surroundings of man in home and fac-

tory. Here, too, the concern is not only with the prevention of hazards, but with the raising of physiological tone.

Although we are taught in any modern school of hygiene that sanitary progress should be symmetrical, it is the peculiar habit of communities to consider but one problem at a time.

The engineer, with added tasks, is attempting to follow, however, his age-old road toward the control of environment for the benefit of man. He believes, with Wyndham Lewis, that "community plumbing is one of the very modern fine arts. Like criticism, it is useful!"

## Industrial Hygiene\*

ALICE HAMILTON, M.D., F.A.P.H.A.

*Assistant Professor, Industrial Medicine, Harvard School of Public Health,  
Boston, Mass.*

A SURVEY of the field of industrial hygiene during the past year shows the profound effect which the business depression has had, an effect to be deplored but also to be recognized as inevitable. It would not be reasonable to ask of industry now that it enlarge and improve medical and welfare departments or even that expensive alterations be made for the safeguarding of health. When men are being laid off by thousands and those retained are working half time or less, all available money must go into wages, unless, indeed, the conditions of work are such as to offer a clear and recognized menace to health.

However, although not much practical improvement can be looked for at present, the study of health problems in industry goes forward without halt; it seems that research flourishes especially well during a period of business depression. Perhaps the most absorbing subject has been, as it should be, industrial dusts, those with free silica first, but also asbestos, interest in which, as was true of silicosis, has been stimu-

lated by the excellent work of English experts. Many investigations and experiments have been published during this last year, dealing not only with the effect of these dusts on the human lung, but also with methods of estimating the dust contamination of the air, and methods of preventing it.

It is hard to say what subject comes next in order of importance. Perhaps it is industrial cancer, the study of which was undertaken in all the industrial countries at the request of the Health Committee of the League of Nations. Here again the English led, for industrial cancer of the skin constitutes a major problem in that country, while in others, notably our own, it is of minor importance. Nevertheless, the investigation of the subject in this country, with results largely negative, has added to our knowledge of the causation of this particular form of cancerous growth. For instance, one of the greatest drains on the English sickness insurance comes from the prevalence among makers of patent fuel, briquets, of a slowly developing skin cancer of low malignancy. The English make enormous quantities of this fuel, using hand work, by mixing coal dust

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

with a binder of gas-works tar. We do not make nearly so much, use a binder of petroleum asphalt, machinery instead of hand work, and do not have 'briquet makers' cancer. Mule spinning employs thousands of Englishmen and scrotal cancer is very prevalent among them—has been ever since vegetable lubricating oils were displaced by Scottish shale oil. We do some mule spinning, and exactly in the same way as the English, but we use refined Pennsylvania lubricating oils and the only cases of mule spinners' cancer we could find in this country were in men who had emigrated from Lancashire where they had already carried on their trade. To these few instances could be added a number of others but they are enough to show that the study is of interest, not only in revealing our freedom from a very troublesome occupational disease, but also in adding to the gradually accumulating fund of knowledge concerning the chemical nature of the carcinogenic factor in oils, pitches and tars. This factor has not yet been isolated, but the pursuit is being narrowed down, and the end of the chase cannot be far off.

Closely connected with this field is that of malignant growths caused by the action of radio-active substances. For many years it was a matter of common knowledge that the miners in the Schneeberg region of Saxony suffered to an amazing extent from pulmonary carcinoma. The cause was variously held to be the arsenic in the ore, the chronic irritation caused by pneumoconiosis, and the radio-activity of the dust in the mines. It was most puzzling, however, that on the other side of the mountains, in Bohemia, no such disease had ever been discovered. This last year, the mystery has been cleared up. An impartial and scientific inquiry into the Bohemian mines and the condition of the miners revealed the same prevalence of lung cancer as on

the Saxon side, and, since in Bohemia there is little pneumoconiosis, the cause seems to be established as residing in the proven radio-activity of the ore dust. In this country our contribution to the study of new growths caused by radiation has been very important. I need only refer to the work of Martland, who first described the cases of aplastic anemia with bone necrosis in women who had been exposed to the action of alpha rays from the swallowing of luminous paint, and more recently has been publishing reports of the development of bone sarcoma in those who, less severely poisoned, have lived on and now exhibit this other type of effect.

Judging by the attention it attracts, one would have to put chromic acid high up in the list of dangerous poisons, and yet we all know that its importance is insignificant; but the great growth of chrome plating has brought it about that many men are now exposed to chromic acid spray and this is one of the poisons that works conspicuously, producing injury that is not serious but is very easily recognized. The result is that enterprising members of the legal profession are able to make much undeserved trouble for manufacturers and to spread among workmen the idea that here is a very dangerous poison whose evident effects only mask the more deadly internal injuries. British factory inspectors report that no case of chrome ulcer undergoing carcinomatous degeneration has ever been reported, nor any case of constitutional trouble. The lesions are local always.

Among the old familiar poisons we have a few new developments. More cases of arsenical poisoning due to the use of insecticides are being reported as such use increases. In lead, we have much evidence confirming Aub's theory of the storage of insoluble lead phosphate in the skeleton and its mobiliza-

tion under conditions leading to a change in the hydrogen ion concentration, also confirmation of his therapeutic procedure based on this theory. Aub's latest pronouncement on the treatment of plumbism is as follows:

De-lead by the administration of acids and a diet poor in calcium, keeping it up for 3 to 4 weeks, then interrupt when the patient has lost appetite and feels poorly. Resume it, if necessary, then follow with a calcium-rich diet, to restore the calcium which has been lost in the course of de-leading, inasmuch as calcium and lead metabolism go together.

Coal tar benzene continues to be the subject of investigation, for in spite of all efforts at its elimination, it is still used to a considerable extent in industry. McCord has just issued a book dealing with benzene in all its aspects.

Hydrofluoric acid and the fluorides are coming into much greater prominence because of their newer industrial uses and of their use as preservatives of foods. Pickling of metals is now done with hydrofluoric acid; sodium acid fluoride and sodium silico-fluoride are added to laundry soap mixtures; and although ordinary ground glass is now made by sandblasting instead of etching with acid, all electric light bulbs are frosted by immersion in this acid. The French have of late described what they call "fluorisme," chronic poisoning with hydrogen fluoride, which they have observed in man and produced in animals, by prolonged ingestion of minute amounts or exposure to

the fumes. It consists in cachexia, rigidity of the spine, and fragility of the bones.

Looking at the field of industrial hygiene in general, two things impress one: The first is that, because of widespread poverty and unemployment, we must expect a much larger number of unwarranted or exaggerated claims for alleged injury to be brought against employers by workers. This is understandable, but unless it is vigorously opposed, it will lead only to the disadvantage of the working class, by discrediting laws passed for their protection.

The second is that, owing to this same cause, we must expect to see the loss of standards which is already only too evident, keep on for some time. Already we are forced to admit that it is better for a man or a woman to take employment at a wretchedly inadequate wage, or under conditions far from ideally healthful, than to join the ranks of the applicants for public charity. That unscrupulous employers will take advantage of this peculiarly helpless state of labor is to be expected, but even the scrupulous employer may well think that he would himself prefer to risk sickness rather than to face certain penury. Apparently we can do little now to stem the downward course, but surely we can be alert to sense the first signs of revival and then to begin at once to insist on a return to the higher standards of our prosperity, none too high, at any time.

# Food and Health\*

HENRY C. SHERMAN,

*Department of Chemistry, Columbia University, New York, N. Y.*

I AM asked to speak on "Food and Health" in behalf of the Food and Nutrition Section. Only recently, however, has this Section included Nutrition in its title.

The greater part of the work of this Section has had to do, at least until recently, with problems of the ways in which food may injure health; as, for example, by carrying pathogenic microorganisms, or through containing deleterious substances added as preservatives, as artificial colors, or as gross adulterants, or formed in the food as a result of its deterioration.

Until recently, such possibilities, that food as purchased by the consumer might bring him some direct injury, were the liveliest issues of most discussions of food in this Association and among health officers and students of health problems generally.

Near the middle of the history of our organization, such questions were very acute. That was a period in which some of the discussions of pure food problems may have generated more heat than light; but the debates of those years did lead both to the searching of hearts and to the study and development of scientific, technological, and administrative methods of food control.

When there had developed a sufficient degree of confidence in food control, the federal food law was passed. It has now been in operation just over 25 years and has truly worked a peaceful revolution in the relations between the producers and consumers of food.

The passage of the federal food law, and of the supporting state legislation which followed rapidly, was a triumph for those who had labored for "food reform," and it was also a result and an index of the trend of the times.

It meant, that the methods for scientific control of the food industries, as well as for the policing of their products through wholesale and retail trade, had been developed to a point capable of commanding the confidence of the leaders among both producers and consumers.

Primarily designed for the protection of the consuming public, the food laws also function as rallying points for standardization and advance within the food industries themselves. Correspondingly, the officials who administer the Food and Drugs Act find that they can exercise a more effective control by using more of educational than of punitive measures.

And in addition to this gratifying degree of coöperation between the scientific and executive representatives of the food industries and the agencies of governmental control, we have the far reaching and efficient forces of agricultural research—federal, state, and privately endowed—working constructively upon all sorts of food problems in the interest of producers and consumers alike. More and more, food problems are coming to be looked upon from the viewpoints of science and of community welfare.

In the present membership of our own organization and most of its standing committees, we find the food control official, the scientific expert who guides

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

the production and industrial technology of food, and the teacher and investigator from the college or university, working together in unified effort for the good of the community as a whole.

So thoroughly has the pure food idea been assimilated during the past quarter century, and so effectively have the principles of sanitation (as well as of fair dealing) been applied in the production, handling, and inspection of food in recent years, that in general the consumer may now safely assume that food products offered for sale will not contain anything directly deleterious to health—that not fear of fraud or active injury but intelligent use of nutritional resources may be uppermost in mind as one now thinks of food.

Thus, largely because of the very success of the so-called pure food movement, the center of gravity of the general problem of the relation of food to health has shifted from sanitation to nutrition.

And this has come about at a most opportune time, for recent research has developed unexpected and far reaching possibilities in the relation of food to health through nutrition. We have found some, at least, of the keys, not only to the prevention of deficiency diseases and the reduction of susceptibilities to many infections, but also to the advancement of positive health and longevity through the simple application of the newer knowledge of nutrition in the daily choice and use of our common articles of food.

Until recent years, the food chemist was in the embarrassing position that while he could analyze an article of food in almost any degree of detail the importance of the case might require, he had never attained permanent success in the attempt to nourish an experimental animal with any mixture of the substances which his analysis revealed. And, in fact, the purer the substances entering into such an arti-

ficial food mixture, the sooner would failures of normal nutrition appear!

It became evident that some further means of investigating food values was needed, and this was found in the use of experimental animals as laboratory reagents and instruments of research into problems of the chemistry of food and nutrition.

Once this broadening of their armamentarium of food research had become established, chemists were soon rewarded by a whole series of discoveries of substances absolutely essential to nutrition but whose existence was previously entirely unknown or only very vaguely apprehended.

These substances have been discovered in too rapid a succession for their physical isolation and complete chemical identification to keep pace. Thus it accidentally comes about that they go under the one group name of vitamins, whereas, in fact, they are not so related in chemical nature or nutritional function as the use of a common group name must necessarily tend to suggest. Hence, even at the risk of tiresome repetition, we must constantly emphasize the important fact that the vitamins are not related to each other and have so little in common that no one of them can take the place of any other one; that the vitamin problem is in reality a whole group of independent problems, each vitamin demanding separate consideration.

But the discovery of the existences and essential functions of the vitamins constitutes only the first step in this new line of advance of our knowledge of nutrition. For chemical research has rapidly pressed on from the qualitative study of the occurrence and functions of the vitamins to the quantitative investigation of the relative vitamin values of foods and the optimal relations of nutritional intakes.

And this has proved to have a broader significance, from the point of view of

the student of life and health, than merely that it represents the general present-day tendency for each branch of scientific inquiry to develop itself, so far as may be, into an exact science. This in itself would mean much for the best use of food resources in the interest of public health and social justice, but this line of research has also revealed an even more far reaching significance.

It has been found that, starting with an adequate diet and a normal condition of nutrition and health, it is possible to advance the average of the existing status of health and longevity by enriching the ordinary daily dietary in certain of its chemical factors, by such simple means as merely the shifting of quantitative proportions in which our everyday foods are consumed. And this comes about not only through a further reduction of early death rates but also through a material improvement of the life expectation of the adult.

Just which of the chemical factors essential to normal nutrition are concerned in this positive advance of the already normal status of health and longevity, and in just what degree the average life cycle may thus be extended, are problems which are still being studied and for the complete solution

of which there will probably be needed some years of further experimental research.

Meanwhile we may speak with confidence of a positive relation of food to health and longevity. The average of acceptedly normal health and longevity can be advanced by applying the newer knowledge of nutrition in the daily choice and use of food.

Such an advance of average attainment in positive health and in the life-expectation of the adult, does not necessarily imply anything unprecedented so far as individual cases are concerned. What we may confidently anticipate is that quantitative research in the chemistry of food and nutrition has here opened the way to the attainment by many more people of that full measure of health and well rounded cycle of life which only the more fortunate now enjoy.

And, so far as we can see, the contribution thus offered by chemistry through nutrition stands in no wise in rivalry with anything else, but can be added to the gains which are being effected through all the other aspects of the great movement for the advancement of human welfare through public health and individual hygiene.

## Health Education\*

IAGO GALDSTON, M.D., F.A.P.H.A.

*Director, Medical Information Bureau, New York Academy of Medicine,  
New York, N. Y.*

WERE I to attempt to tell you what is new in health education, I would be obliged to reiterate most of what was said by the preceding

speakers, and to anticipate much of that which will be said by those who are to follow me. For it is the privilege and obligation of our specialty to make use of all that is established and newly discovered by the other divisions in the field of public health. And yet

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

there is a good deal that is new in public health education, concerning which I would like to say a few words.

Thus, we in the Public Health Education Section have discovered that we are growing up. There is a characteristic crack in our voice, and there is the suggestion of a sprouting stubble upon our figurative chin. We are approaching the state of adulthood. We have crystallized our years of experience and have begun to formulate basic principles affecting our specialty. We have issued texts, as is witnessed in the works of the Routzahns. We are even bold enough to venture into the psychological phases of health education, and to refine our knowledge in this field. We have learned not only how most effectively to impart facts, but how to make those facts motivate human behavior.

Even more encouraging than the discovery of our own growth is the recognition that others are discovering us too. The other sections of the American Public Health Association are becoming aware of our existence and even convinced of our usefulness. The exuberant enthusiasm with which our Health Education Institute has been attended bears witness to this. Evidently, there must be something of value in our doings, or else we could not have attracted from the membership of the American Public Health Association a student body four times as numerous as we had hoped for.

All of which is very good. Those who have paid close attention to the trends of public health have come to realize that we have about exhausted the possibilities of doing for people that can be done for them, and that the approaches, in fact are already success in this epoch in which, if further experimentation in health is made, the people of the sub-  
vealed. An  
substances

must be taught to do things for themselves.

The great epoch in public health whose end we have recently witnessed was characterized by the elimination of many heretofore dominant diseases by the agencies of public health legislation, and the employment of vaccines, sera, immunizing and sterilizing agents. During this period great things were done unto and for the people, who themselves contributed little or nothing. What had the population at large to do with the blotting out of smallpox, or of cholera, or of bubonic plague?

But now those diseases which were subject to such mastery have already so been mastered. Today we find dominant the degenerative diseases, and those diseases which affect the emotional and psychologic aspects of human life. If we are to succeed in conquering these diseases, it will only be with the conscious coöperation of the individual in the community. We cannot hope for a vaccine to eradicate the various dementias, or for an anti-toxin that will immunize an individual against unhygienic and irrational living habits.

Public health education must therefore prove an important agent in the armamentarium of the public health doctor of today and tomorrow. It is and will evermore be the task of health education to impart basic knowledge relative to the prevention of diseases and the conservation of well-being. It will also be our task so to fashion our instruction that men will be not only informed but also persuaded. This is as it should be. The progenitor of Hippocrates was Apollo, the god not only of medicine but of music as well. And we in public health education are dedicated to Apollo and his arts.



# Trends in Public Health Nursing\*

HELEN C. LAMALLE, R.N., F.A.P.H.A.

*Superintendent of Nursing, Metropolitan Life Insurance Company,  
New York, N. Y.*

THE progress of public health nursing depends upon the acceptance of constructive trends that will make it possible for us to scrutinize our present program. You will agree that the time has arrived for a careful, critical analysis of actual performance in nursing practice.

As public health nursing is a community service, we have to keep in mind the changing social conditions, and modify our methods accordingly.

Having considered many trends in my study, I have selected three because of their importance to the field of public health and to public health nursing as a whole.

1. Trends with respect to nursing practice
2. Trends with respect to community relationships
3. Trends in the growing consciousness on the part of Health Officers as to the importance of communicable disease nursing

Let us consider first the trends with respect to nursing practice. As we obtain a better knowledge of communities our nursing service should be adapted to meet newly disclosed needs. All nursing is aimed at placing emphasis where it is most likely to do the most good.

Too much emphasis has been put on quantity rather than on quality. I think it makes for a better service if the family has more responsibility; if we try

to make every visit count, and to eliminate useless visits.

The goal is responsibility. There is a continual trend in the direction of preparing nurses for specific responsibilities.

Is it recognized that it is a legitimate function of organizations to provide training in service? to keep the staff alert to their opportunities? to have a continual educational process so that better service will result? Unless the principles taught through training are being properly applied routinely and systematically, then all efforts to effect the best service will be lacking in results. I think there is a much better understanding of this point.

Staff education is constantly growing and the best staff education is a continuous process. It requires frequent contact of the staff worker with the supervisor, who by reason of training and experience, is qualified to direct and aid her with her daily problems. The education of a staff nurse is not accomplished through introduction and initial demonstrations. It is a matter of months of careful instruction and constant supervision.

There is a trend that makes us conscious that no one is a good worker unless she is happy and healthy. She must be interested in her work before she can do good work.

Secondly, we will consider the trends with respect to community relationships. Some years ago only the very poor would use the nursing service, but

---

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

now the service is being asked for by a much better class on the part-time basis, and therefore the demand for service is increasing. We have with us not only the poor in increasing numbers but we have this new demand.

There is a trend toward generalization and amalgamation. There is much closer coördination toward building a community program. The economic situation is resulting in closer bonds between local health and social work agencies. Concerted efforts in fund raising encourage joint program planning. Some Community Chests have organized special advisory committees to help plan to meet changing conditions, and usually the public health nursing agency is represented. With the united forces collectively discussing their problems and combining their efforts toward the same aims and ends, we should have better equipped and more responsive agencies.

The third and perhaps one of the most important trends to consider is the growing consciousness on the part of health officers toward the need for nursing care to communicable diseases. Health officers in the past have generally not approved the inclusion of nursing care to communicable diseases in the general nursing picture. The program should provide more definitely for this, and for close and mutually advantageous relations between health officers and private organization nurs-

ing services. Every health officer has the leadership and authority to aid in developing a well rounded community program which will include a larger measure of nursing care to communicable diseases.

I have the privilege of representing a company which has established nursing service in more than 5,000 cities and towns. During 1931, the company spent more than \$4,000,000 for nursing service which made possible service to upward of 800,000 cases, and in the analysis of more than 200,000 of these only about 5 per cent were of measles, scarlet fever, whooping cough, diphtheria, and other communicable diseases. You will agree that this study reveals that relatively few cases of communicable diseases are being nursed.

I cannot help wondering how the large number of Metropolitan policy holders who were ill with communicable diseases fared during 1931. How much did lack of care and lack of knowledge on the part of these sick policy holders contribute to the spread of communicable diseases? How many are suffering from unfortunate effects which might have been prevented, simply by knowledge? It is impossible to contemplate this gap in nursing service without realizing that it may represent a large volume of serious incapacity as well as loss of life. Is not the stopping of this gap of vital importance to all interested in public health?

# Current Work of the Section on Epidemiology\*

HAVEN EMERSON, M.D., F.A.P.H.A. (*Life Member*)  
*Professor of Public Health Practice, Columbia University,*  
*New York, N. Y.*

IT is the proper rôle of youth to have no past, and to speak only when spoken to. On behalf of my colleagues may I say that the session of today seems to me symbolic of the spirit of the American Public Health Association in which the young and old discuss on the same level of purpose problems of common concern.

It is wholly fitting that the message and report of the Section on Epidemiology should come last on this program. Chronologically the youngest of the sections and functionally the final building stone in the structure of public health practice, epidemiology brings critical tests to bear upon performance, and establishes principles of procedure based upon exact information and mathematically valid inference.

Whether originating from the sciences of laboratory medicine, or engineering, or mathematics, or out of the disciplines of observational or clinical medicine, the epidemiologist is entitled to the distinction of a specialist in public health. In fact, he is a master of the natural history of disease as it expresses itself on groups of persons, related by some common factor such as age, sex, race, occupation, or geographic distribution, as well as by the development of disease.

Without necessarily being a practitioner of any of the basic sciences of medicine or sanitation he must be able to use them in arriving at his own objectives.

By familiar tests, epidemiology is not only a vocation, a career, an intellectual discipline, an administrative function; it is a science in so far as its theories and laws of disease performance are based upon the accumulated facts, and objective reasoning, and to an increasing degree upon planned experiment, both upon man and upon the lower animals.

And when the idea is firmly fixed in mind that epidemiology is more than the science of epidemics or of epidemic disease alone, and that its function is not solely to nose out the particular case of origin of an outbreak of communicable disease, then we shall have registered a step in advance in the conception of the qualities and performance to be expected of its devotees.

Epidemiology has lived long enough to have had its amateur and professional periods, its observational and its experimental phases, and it appears now to be firmly established as a discipline in education in public health, and as a controller of public health practice.

While Fracastorius in his *De Contagione* in 1450 made what is probably the first important contribution to the method of study and reasoning which we now assign to epidemiology, we must credit the teachers of vital statistics and

---

\* Presented at the Ten Star Final Special Session of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

preventive medicine in Edinburgh, Glasgow, and London of the last 75 years with laying the foundations for the modern science and practice of this specialty. One society in England, now merged as a section under the Royal College of Physicians, the young American Epidemiological Society, and the Section on Epidemiology of the American Public Health Association, are to my knowledge the only formal organizations devoted to its cultivation and promotion.

After 2 experimental years with programs in epidemiological problems (1927-1928), the creation of the section was approved. A consideration of the separate and joint programs of the section offers food for thought.

Of the 59 papers presented (1927-1932), 11 have dealt with enteric disease, 7 with meningitis, 6 with diphtheria, 5 with tuberculosis, and 5 with syphilis. If one were to recall contributions of outstanding and permanent significance there would come to mind those of Jordan, and Collins, and Frost on influenza, Gordon on scarlet fever, Parran and Munson on syphilis, Rosenau, and Hervey, and Dean on typhoid, and Godfrey on diphtheria.

It would be my personal opinion that the influence of Gordon's studies in determining the safety of variable isolation periods for scarlet fever according to season and age of patient, and of Munson's on the individualization of epidemiological attack upon syphilis in its household or village manifestations will have most important influences on

the habit and thought, and on public policies in the near future.

Related we grow in strength and usefulness, apart and separate in our specialties we weaken and lose power. For this reason the declared policy and fond hope of the Epidemiology Section is to have at least 1 and preferably 2 of its allotted sessions each year with one or more of the other sections, the Laboratory, Health Officers, Vital Statistics, and Public Health Engineering Sections in particular.

If one were to point out the most fertile fields for the application of the epidemiological method to the study of preventable disease he would probably suggest that in diseases of occupation and disorders of nutrition the largest returns would come.

When the validity of each public health procedure is tested with the rigor which curative medicine has applied to the results of drug and other therapy, we shall find the epidemiologist of the department of health playing an increasingly responsible rôle not only in controlling communicable disease but in replacing tradition, superstition, and popular opinion by science in the administrative practice of public health.

Epidemiology is perhaps the most romantic and intriguing of the specialist vocations of public health, unless it be that of the public health nurse. Furthermore it is clear that among the disciplines of a complete education in medicine, epidemiology must be included.

NOTE. The paper presented at the Ten Star Final Special Session by James F. Rogers, M.D., Dr.P.H., Consultant in Hygiene and Specialist in Health Education, U. S. Office of Education, Department of the Interior, Washington, D. C., on Child Hygiene, was published in the November, 1932, *Journal*.

# Suggested Procedures for the Presumptive Test in the Determination of the Coli-Aerogenes Group<sup>\*</sup>

C. T. BUTTERFIELD

*Principal Bacteriologist, U. S. Public Health Service, Cincinnati, Ohio*

THE concentration of members of the coli-aerogenes group of bacteria in a potable water has been recognized as a measure of the safety of the water. In attempting to determine quantitatively any specific organism possibly present in a mixed culture of bacteria, some differential medium which will indicate with a fair degree of accuracy the presence or absence of that organism is a primary essential.

As such a presumptive test for members of the coli-aerogenes group, the fermentation of dextrose with the production of acid and gas originally was recognized. Later it was observed that all of the organisms which produced this change in dextrose did not belong to the coli-aerogenes group and that a much smaller group of organisms which could ferment lactose with gas production included all members of the coli-aerogenes group. As Sir Alexander Houston has so aptly said, the test for the coli-aerogenes group is "the sheet anchor of the bacteriologist" and the fermentation of lactose is "the common ground upon which all water bacteriologists can meet."

During the past 15 years a large amount of information in regard to the

permissible concentration of members of the coli-aerogenes group of bacteria in potable waters has accumulated, based on a determination of the group by *Standard Methods* procedures with lactose broth as the presumptive medium. Epidemiological studies have indicated that when potable waters are free, to a certain extent, from coli-aerogenes bacteria as determined by these procedures, the consumer has also been remarkably free from water-borne diseases. The maximum concentration of these organisms which might be permitted in a water without an increase in the incidence of disease has not been definitely defined. Such determinations might indeed be hazardous to the consumer.

Numerous efforts have been made during this period to increase the efficiency of this presumptive test and thus reduce the labor and the time required for this determination. In general these efforts have been directed along two lines: (1) to add to the presumptive lactose medium some inhibitive agent which would prevent or restrain the growth of organisms that do not belong to the coli-aerogenes group without interfering with the development of any member of this group; and (2) so to reduce the nutritive ingredients of the presumptive lactose medium that the growth of

<sup>\*</sup> Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

organisms other than coli-aerogenes would be restrained.

The former procedure has been most productive of media that have been widely used, and the present discussion will be limited to a consideration of the results obtained with some of these restrictive media.

Bile and certain of the dyes and combinations of bile and dye, have been employed most extensively as inhibitive agents. At first, using these materials in lactose broth, widely divergent results were obtained. Thus Cumming<sup>1</sup> found that lactose bile very markedly inhibited members of the coli-aerogenes group, while other workers considered that it was preferable to, and more productive than, standard lactose broth in the determination of the group. Studies made subsequently have shown that different batches of bile and dye vary in their inhibitive properties. In addition, these studies have tended to standardize these products and the methods employed in their use. Levine<sup>10</sup> has shown that bile in a concentration of 1 to 2 per cent favors the growth of members of the coli-aerogenes group, while in greater concentration it inhibits them. Ruchhoft<sup>13</sup> has observed that hydrogen ion concentration of brilliant green bile lactose broth markedly influences its inhibitive properties, high concentrations making it more inhibitive to coli-aerogenes organisms, and low concentrations rendering it ineffective in restraining even the growth of Gram-positive spore-bearing bacteria.

On the basis of the information obtained in these studies and in others which are considered in the reports of the Committee on Methods of the American Water Works Association, Dunham *et al.*,<sup>3</sup> Jordan,<sup>5</sup> brilliant green bile lactose broth has been indicated for further study as a presumptive medium, using two standardized methods of preparation. In one the concentra-

tions were, bile 2 per cent and brilliant green 1/75,000, and in the other, bile 5 per cent and brilliant green 1/20,000.

Using these two broths and standard lactose broth as presumptive media, we have made comparative determinations on 39 samples of raw waters and 44 samples of effluents. Isolations in pure culture were made from all gas-forming tubes and the completed test was applied. The same confirmatory tests were applied in each instance, the only variation in the procedure being in the presumptive media employed.

In the analyses of the 39 samples of raw waters, the average most probable number of coli-aerogenes group organisms per c.c. was: with *Standard Methods* lactose broth 3,920, with 5 per cent brilliant green bile 3,570, and with 2 per cent brilliant green bile 3,300; or placing the results on a percentage basis and considering those obtained with standard lactose broth as 100 per cent, the 5 per cent brilliant green bile broth detected 90.1 per cent, and the 2 per cent brilliant green bile broth 84.2 per cent of the coli-aerogenes group organisms present.

From 44 samples of effluent waters, the average most probable number of coli-aerogenes organisms as determined by standard broth was 268, by 5 per cent brilliant green bile broth 94, and by 2 per cent brilliant green bile broth 99. Thus with samples from this source, with the results from standard broth taken as 100 per cent, the 5 per cent brilliant green bile detected 35.0 per cent, and the 2 per cent brilliant green bile 36.9 per cent. It was also observed that the per cent of positive presumptive tubes confirming was much greater for the brilliant green bile media than for *Standard Methods* lactose broth.

The results obtained indicated, as has been claimed, that brilliant green bile presumptives confirm in almost 100 per cent. However, they also showed,

with equal conclusiveness, that with the effluent samples the brilliant green bile media detected only one-third as many organisms of the coli-aerogenes group, rather than 90 to 95 per cent as has been claimed. The objection may be raised that the additional organisms detected by the standard procedure are not really members of the group, or that they have no sanitary significance. This may be true. However, this section of the group was represented in the evidence considered in the establishment of standards for safe water supplies, and consequently the use of brilliant green bile as presumptive media would be the equivalent of lowering the standard threefold.

While it is not possible in this brief paper to review the tremendous amount of research work that has been done with presumptive media containing brilliant green and bile, the data which

have been reported are in general agreement with the above results. Reference is made to the reports of Dunham, McCrady, and Jordan,<sup>3</sup> Howard and Thompson,<sup>4</sup> and Ruch-hoff,<sup>12</sup> for a review of such studies.

The results obtained by 15 research workers for the Standards Committee of the American Water Works Association, as reported by Jordan,<sup>5</sup> are of peculiar value for three reasons: (1) the waters examined were from widely distributed sections of the country, (2) the media used at each laboratory were of approved formulae and were identical in each instance, and (3) the technique employed in the different laboratories was uniform. A recalculation of the results given in Table I of this committee report is presented in Table I to show the per cent of coli-aerogenes group completions obtained by *Standard Methods* confirmatory procedure when: (1) *Standard Methods* lactose broth, (2) brilliant green bile 5 per cent lactose broth, and (3) brilliant green bile 2 per cent lactose broth, were used as presumptive media.

It is observed that while the average number of completions obtained from the 5 per cent brilliant green bile is 71.6 per cent, and from the 2 per cent medium is 80.5 per cent, as compared with the standard, the individual results with waters from the different sources vary from 45.4 to 90.9 per cent with the 5 per cent bile medium, and from 56.3 to 95.0 per cent with the 2 per cent bile medium. This indicates that brilliant green bile media are not equally sensitive in detecting bacteria of the coli-aerogenes group in waters from different sources, being very markedly inhibitive in some instances and only slightly so in others. No doubt if the effluent samples were considered separately the results would be still more divergent. This also indicates that this medium is not suitable for a standard and would tend to ex-

TABLE I

PER CENT OF COLI-AEROGENES GROUP COMPLETIONS OBTAINED BY STANDARD METHODS CONFIRMATORY PROCEDURE WHEN: (1) STANDARD LACTOSE BROTH, (2) BRILLIANT GREEN BILE LACTOSE BROTH, 5 PER CENT, AND (3) BRILLIANT GREEN BILE LACTOSE BROTH, 2 PER CENT, ARE USED AS PRESUMPTIVE MEDIA \*

Source of Report	<i>Standard</i>		
	Lactose Broth	B. G. B. 5 Per Cent	B. G. B. 2 Per Cent
Omaha	100	65.9	70.4
Columbus	100	73.5	86.7
Grand Rapids	100	90.5	90.5
Cincinnati	100	50.0	56.3
Toronto	100	80.2	85.1
Indianapolis	100	68.2	81.1
Washington	100	75.0	90.0
Fort Worth	100	45.4	66.7
Lansing	100	86.0	84.0
Montreal	100	76.2	80.9
Chicago	100	65.7	88.5
Minneapolis	100	70.5	95.0
Tucson	100	70.4	81.8
Sacramento	100	88.5	82.8
Detroit	100	90.9	90.9
Average	100	71.6	80.5

\* Data of Am. W. W. Assn. Committee Report, J. Am. W. W. Assn., 18:337, 1927.

plain, perhaps, differences of opinion which have arisen in regard to its value as a presumptive medium.

As it is recognized as essential to go at least one step beyond the fermentation tube to establish the identity of members of the coli-aerogenes group, every advantage is to be gained by using a presumptive medium which will permit the largest number of these bacteria to grow and indicate their presence.

Because of its application to the discussion which will follow on the parallel planting procedure, digression is made at this time to consider the use of brilliant green bile lactose broth as a confirmatory medium. In the report referred to above (Jordan),<sup>5</sup> confirmations obtained by *Standard Methods* procedure and by direct transfer from the presumptive lactose broth tubes to brilliant green bile, 5 and 2 per cent, were compared. From the data presented in this report, using the standard procedure results as a basis of comparison, the completions obtained from these confirmatory procedures by each of the 15 workers are given in Table II.

It is observed that in most instances the confirmations obtained with either bile medium compare favorably with those from the standard procedure. In 4 cases—samples from Omaha, Indianapolis, Montreal, and Chicago—the number of confirmations obtained with the green bile media was definitely low. This would seem to indicate, if it were not for these exceptions, that the fermentation of lactose with gas production in the presence of certain amounts of brilliant green and bile constituted a satisfactory confirmatory test for the presence of members of the coli-aerogenes group. The exceptions indicate that other factors must be considered.

In this connection it must be borne in mind, as is generally accepted, that in order to place an unknown bacterium

in its proper genus, it must be in pure culture and some information must be obtained in regard to its morphological, cultural, and physiological characteristics. Frequently it is necessary also to consider its pathological features.

TABLE II

PER CENT OF COLI-AEROGENES GROUP COMPLETIONS OBTAINED WITH STANDARD LACTOSE AS A PRESUMPTIVE MEDIUM WHEN CONFIRMATIONS ARE MADE BY: (1) STANDARD METHODS PROCEDURE, (2) TRANSFER TO BRILLIANT GREEN BILE LACTOSE BROTH, 5 PER CENT, AND (3) TRANSFER TO BRILLIANT GREEN BILE LACTOSE BROTH, 2 PER CENT \*

Source of Report	Standard		
	Pro-cedure	B. G. B. 5 Per Cent	B. G. B. 2 Per Cent
Omaha	100	86.3	88.6
Columbus	100	91.1	92.6
Grand Rapids	100	100.0	100.0
Cincinnati	100	100.0	100.0
Toronto	100	96.3	97.5
Indianapolis	100	85.8	87.1
Washington	100	100.0	100.0
Fort Worth	100	100.0	96.9
Lansing	100	94.0	96.0
Montreal	100	90.5	85.7
Chicago	100	71.4	71.4
Minneapolis	100	98.3	100.0
Tucson	100	100.0	100.0
Sacramento	100	100.0	97.1
Detroit	100	98.6	100.0
Average	100	94.4	95.0

\* Data of Am. W. W. Assn. Committee Report, *J. Am. W. W. Assn.*, 18:337, 1927.

Without some such system for the differentiation of the bacteria, even greater confusion would exist in attempts at classification.

Based on this system, the established criterion for the allocation of bacteria as members of the coli-aerogenes group of "all non-spore-forming bacilli which ferment lactose with gas formation and grow aerobically on standard solid media," takes 4 of these primary characteristics into consideration. The suggested change limits the identification to one characteristic—the fermentation of lactose in the presence of



brilliant green and bile. This suggested criterion, to conform with the established standards, would imply the following assumptions: (1) that all coli-aerogenes group bacteria grow and produce gas in brilliant green bile media, (2) all spore-bearing lactose-fermenting bacteria, aerobic or anaerobic, fail to indicate their presence, (3) all organisms fermenting this medium with gas production are bacilli, and (4) all organisms producing gas in it are aerobes or facultative aerobes although they have been grown only under practically anaerobic conditions. While these assumptions are known to be subject to limitations, and adoption of such a procedure would seem to be at variance with sound bacteriological practice, the favorable results obtained might warrant the adoption of a transfer to brilliant green bile as an alternative confirmatory procedure in locations where it has proved efficient.

A parallel planting procedure designed to combine the advantages of the productivity of standard lactose broth with the restrictive qualities of brilliant green bile, by providing for the inoculation of tubes of each medium in parallel with duplicate portions of a sample, was suggested by Jordan.<sup>5</sup> This procedure has been amplified by Jordan<sup>6, 7</sup> in subsequent papers, and an interpretation of the sanitary significance of the results obtained based on a special arrangement of the coli-aerogenes group was suggested.

As the interpretation of this procedure is based on the consideration of each pair of tubes as a single unit and on the assumption that the inoculation introduced into each tube of a pair is identical, marked differences of opinion have existed as to the value of the results obtained. Discussions of this phase of the procedure by Frost, Reed and McCrady, which are appended to the last paper by Jordan,<sup>7</sup> definitely set forth the fallacies involved in this in-

terpretation, and the statement of Dr. Reed that "It would seem to me impossible to hope to get any explanation of a combined result that did not carry with it an implicit assumption that logically destroyed the parallel planting procedure," leaves no room to believe that the procedure can ever be employed.

Furthermore, the published suggestions for interpreting results from a parallel planting procedure are made with respect to the assumed age of the pollution rather than to its quantity. All past evidence in regard to the safety of water supplies, as measured by the presence of members of the coli-aerogenes group, has been based on numbers. The principle of assuming that sewage pollution is unsafe in proportion to its assumed remoteness rather than its concentration may be dangerous, and it should be avoided at least until epidemiological evidence has indicated its soundness.

Since it is now recognized as impossible to interpret the results from a parallel planting procedure, the only part of the suggested procedure which is eligible for use is the confirmation of presumptive standard lactose broth tubes by transfer to brilliant green bile lactose broth. This might be utilized as an alternative confirmatory procedure. The factors which must be considered in adopting it have been discussed.

A new presumptive medium has recently been suggested by Dominick and Lauter.<sup>2</sup> It consists of standard lactose broth modified by the addition of methylene blue and erythrosine as inhibitive agents and brom cresol purple as an indicator. They present comparative results obtained on samples from 4 sources with this medium and with lactose broth which show very excellent agreement. They believe that this medium not only eliminates false presumptives but also provides a satis-

factory means of differentiation between the coli and aerogenes types in the presumptive tube.

Studies comparing the Dominick-Lauter medium with standard lactose broth have been reported by Leahy,<sup>8</sup> Leahy, Freeman, and Katsampes,<sup>9</sup> and McCants.<sup>11</sup> All of these reports come to favorable conclusions for the new medium.

To determine in a preliminary way the value of this medium in the examination of samples in this locality, comparative tests were made with it and standard lactose broth. The Dominick-Lauter medium was prepared in accordance with the specifications given by Leahy which he states were approved by Dominick. Two hundred and sixty-five standard portions from 53 samples from the same source were planted into standard lactose broth and into Dominick-Lauter medium. All gas-forming tubes, regardless of the amount of gas formed, were confirmed in accordance with the standard procedure. From the 265 tubes of standard lactose broth, 31 tubes confirmed as containing members of the coli-aerogenes group. From the same number of Dominick-Lauter medium tubes 7 confirmations were obtained. Of these confirmations, 6 were obtained from both media, 1 with Dominick-Lauter medium only, and 25 with standard broth only. This would indicate that with samples from this source the Dominick-Lauter medium was not at all efficient in detecting members of the coli-aerogenes group, being even more inhibitive than brilliant green bile.

Of the reported studies with the Dominick-Lauter medium, that of Leahy *et al.*<sup>9</sup> should have the best comparative value as they report findings from the examination of 1,116 samples from 358 different sources. This article shows that the presumptive tubes in the Dominick-Lauter medium were confirmed in almost 100 per cent, and

that the total number of samples from which coli-aerogenes organisms were isolated was almost identical for the two methods. If the presence or absence of members of the coli-aerogenes group in each sample is considered, there were only 53 out of 1,116 samples, or 4.7 per cent, that yielded contradictory results by the two methods. However, as we have stated before, we are not particularly interested in the mere fact of the presence or absence of members of the coli-aerogenes group in a sample in judging the safety of a water supply, but are intensely interested in the concentration of coli-aerogenes organisms in the sample if they are present. Unfortunately it is not possible from the data given in this paper to determine the coli-aerogenes group indices of the samples. However, it is possible to compare the number of presumptive tests obtained with each medium which confirmed. This will serve to compare the efficiency of the two media although it is of no value in calculating the concentration of organisms in a sample. Such a summary of the confirmed tests obtained by each method has been prepared from the data given by Leahy *et al.*, and is presented in Table III.

The number of positive results obtained from the various dilutions was not even "approximately of the same magnitude for either method," since

TABLE III

SUMMARY OF COMPARISONS WITH STANDARD METHODS LACTOSE BROTH AND DOMINICK-LAUTER MEDIUM AS REPORTED BY LEAHY. A. J. P. H. 21:11, 1931.

Dilutions c.c.	Number of confirmations		Deviation from Standard Methods	
	Dominick-		Actual	Per cent
	Standard Method	Lauter Method		
10	688	744	+ 56	+ 8.1
1	549	440	-109	-19.9
0.1	320	205	-115	-35.9
0.01	53	36	- 17	-32.1
0.001	17	16	- 1	- 5.9
0.0001	7	6	- 1	-14.3

variations of from 6 to 36 per cent occurred. In all concentrations except the 10 c.c. portions the deviations from the standard are negative. This is the reverse of the results ordinarily obtained and makes it appear that some abnormal condition affected the results from the 10 c.c. portions. It is in these larger amounts of sample that the greatest difficulties are encountered in making isolations from standard lactose broth. These results also show that while the Dominick-Lauter presumptives uniformly confirm, the procedure fails to detect a considerable number of coli-aerogenes organisms present in the sample.

It is realized that the standard lactose broth presumptive test is subject to considerable criticism because of the number of presumptive tests which fail to confirm. However, a moderate experience in water bacteriology, in particular with the determination of the coli-aerogenes group, has created a firm impression that the failure to confirm is not as a rule due to gas production by combinations of two or more bacteria working together, or even gas production by bacteria which are not members of the group but that many of the apparently false presumptives are made so by a failure to isolate and confirm the coli-aerogenes group organism after it has demonstrated one of its characteristic reactions.

Improvements in the technic of confirmation, of early transfer from the presumptive tube to confirmatory media, and the distribution of the inoculation on the confirmatory plates so that well isolated colonies, rather than massive growths, are obtained, has gone far toward the elimination of false presumptives. A pure culture must be secured before a satisfactory confirmation can be made. Thomp-

son<sup>14</sup> and Ruchhoft<sup>13</sup> have made a forward step in this direction when they advocated the buffering of standard lactose broth to eliminate the production of hydrogen ion concentrations lethal to members of the coli-aerogenes group. This procedure should be made standard.

While it is expedient to consider procedures which will reduce the number of false presumptives and lessen the work involved, it is not wise to adopt some procedure which will vitiate the results obtained and possibly endanger the safety of water supplies by covertly lowering the standards of purity.

## REFERENCES

1. Cumming, H. S. Investigation of the pollution and sanitary conditions of the Potomac watershed. *Bull. Hyg. Lab.* 104, p. 105 et seq., 1916.
2. Dominick, J. F., and Lauter, C. J. Methylene blue and brom cresol purple in differentiating bacteria of the Coli-aerogenes group. *J. Am. W. W. Assn.*, 21:1067, 1929.
3. Dunham, H. G., McCrady, M. H., and Jordan, H. E. Studies of differential media for detection of Bact. coli in water. *J. Am. W. W. Assn.*, 14:535, 1925.
4. Howard, N. J., and Thompson, R. E. Isolation of Coli group in water. *Canad. Eng.*, 48:413, 1925.
5. Jordan, H. E. Brilliant green bile for the detection of the Coli-aerogenes group. *J. Am. W. W. Assn.*, 18:337, 1927.
6. Jordan, H. E. Lactose broth fermenters. *J. Am. W. W. Assn.*, 22:544, 1930.
7. Jordan, H. E. Brilliant green bile for Coli aerogenes group determinations. *J. Am. W. W. Assn.*, 24:1027, 1932.
8. Leahy, H. W. Comparison of the Dominick-Lauter presumptive test with Standard Methods test for Bact. coli in water. *J. Am. W. W. Assn.*, 22:1490, 1930.
9. Leahy, H. W., Freeman, J. W., and Katsampes, C. P. Comparison of the Dominick-Lauter test for B. coli in water with that of Standard Methods. *A. J. P. H.*, 2, 21:11 (Jan.), 1931.
10. Levine, Max. Does bile inhibit or stimulate growth of Bact. coli? *J. Am. W. W. Assn.*, 9:612, 1922.
11. McCants, J. M. The Dominick-Lauter method compared with Standard Methods in differentiating the Coli-aerogenes group in water analysis. *U. S. Nav. M. Bull.*, 29:552, 1931.
12. Ruchhoft, C. C. Comparative studies of Standard Methods and the brilliant green bile medium. *J. Am. W. W. Assn.*, 16:778, 1926.
13. Ruchhoft, C. C., Kallas, J. G., and Chinn, B. Gas production and pH determination of Coli-aerogenes cultures in sugar broths. *J. Am. W. W. Assn.*, 23:565, 1931.
14. Thompson, R. E. Irregularities in the test for B. coli in water. *J. Bact.*, 13:209, 1927.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZÛCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

CLARENCE L. SCAMMAN, M.D.

ARTHUR P. MILLER, C.E.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD

GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. RUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## RADIUM POISONING

THE excitement caused by the poisoning, or alleged poisoning, of a number of women engaged in applying a radium compound to watch hands and dials is well remembered. We understand the company was very liberal to the victims, and that new methods have been insisted upon which obviate the danger.

Quite recently the papers carried the story of a man who died from chronic radium poisoning said to have been the result of drinking a water which contained radioactive substances. The last number of the *J.A.M.A.*<sup>1</sup> carries the story of a man aged 52 weighing 110 pounds, who was admitted to the hospital in an extremely emaciated and anemic condition, and with necrosis of the jaw. During a period of 5 years he had consumed 1,400 bottles of a water which contained 2 micrograms of radioactive substance in each 2-ounce bottle. The expired breath of this man was radioactive. After death, examination of the bones showed the presence of radium in such quantities that photographic plates were affected, giving quite clear pictures of the teeth and some of the bones. The detection of radium was carried out by the electroscopic as well as photographic methods, both giving positive results. The skeleton contained 73.27 micrograms of radium, while the soft tissue contained only 0.39 micrograms. The conclusion is that radium salts or radioactive substances in general are detrimental to health and fatal to life when introduced into the blood stream, and that the use of foods or drinks containing radium salts should be prohibited.

Since the first reports of radium poisoning appeared, a number of studies have been made and the results published in journals devoted to pathology, industrial hygiene, etc. There can no longer be any question of the danger of the use of such substances, and it is equally certain that they should be under strict control and used only by experts. The advertisements of commercial firms, the rather wide use of

radium and of radioactive substances by the public, and by others who have little or no scientific training is a striking example of the old adage, "Fools rush in where angels fear to tread."

## REFERENCE

1. J. A. M. A., Feb. 11, 1933, pp. 400-402.

## VACCINATION AGAINST SMALLPOX — OR NOT?

IN spite of the century and a third which has passed since Jenner demonstrated the value of vaccination against smallpox, and in spite of the many proofs of its power to prevent that disease, there are still many controversial questions which come up from time to time.

At a recent meeting in England, 3 papers<sup>1</sup> were read on the abolition of the compulsory infant vaccination laws. Two of the authors, Drs. Ledingham and Forbes, favored infant vaccination on a voluntary basis, while a third, Dr. Millard, maintained his attitude, held for some years, against vaccination. Dr. Millard apparently has no doubt of the protective value of vaccination against smallpox, but believes that we now have a type of the disease generally known as "variola minor," which leads to considerable confusion, but at the same time protects against variola major. He suggested that international complications which might possibly arise from such a course could be avoided by calling this variola minor, "alastrim," or "petty-pox."

Against this, McSweeney has published a study<sup>2</sup> of variola minor, in which he advised strongly against the use of such terms as "alastrim," "para-variola," "varioid," "modern smallpox," etc., as being liable to lead to confusion. He pointed out that epidemics of smallpox have varied in virulence ever since the disease has been known, the mild disease having been described in 1770, and again by Jenner in 1798, and believes that the present practice of the Ministry of Health in speaking of this mild type as "variola minor" is suitable as well as correct. He points out that it has never been disproved that variola minor can produce variola major, and urges the need of its control through accurate diagnosis, prompt segregation, vaccination, and the control of contacts.

It is known that the distinction between the two types of smallpox cannot always be made with certainty, the difficulty being especially marked when smallpox reappears in a district after an interval of freedom. Practically all textbooks point out the well known variations in symptomatology and virulence in smallpox, running from types in which there is a violent toxemia which is speedily fatal, to others in which the attack is extremely mild, with eruption absent and symptoms so mild as to escape recognition.

The question of alastrim has led to considerable confusion in administrative measures. In various countries it has been called amaas, alastrim, Cuban itch, variola minor and para-variola. The trend of modern authorities seems to be to use the term alastrim, which has become well known. The disease is clinically like smallpox, but with practically no mortality. Some have tried to separate the two diseases by symptoms, but without marked success, as the resemblances predominate, the rash showing the same distribution, appearing commonly on the 3rd day, though there is sometimes delay, just as there is, however, in smallpox. The eruption goes through the same stages, though it is said that the lesions are smaller and are more superficial. However, few can distinguish one disease from the other clinically. The whole process bears a close-resemblance to

variola and to varioloid, or smallpox modified by vaccination. It is agreed that vaccination protects against the mild form of smallpox, or as we have called it, "alastrim." The disease occurs practically entirely among the unvaccinated and, like smallpox, affects those under 15 years of age predominantly. Fortunately some tests, such as the allergic, in humans as well as in animals, Paul's test, animal inoculation and serological tests have been developed, and some writers urge that these be employed more frequently than has been the rule.

As far as the etiology goes, the only thing that seems to be positively known is that it is a filtrable virus. As far back as 1892, bodies were described which seemed to be characteristic of the lesions of smallpox and of vaccinia (Guarnieri, Monti, Pfeiffer, Clarke, Councilman, and others). In 1906, certain granules were described by Paschen, which could be demonstrated in the variolous lymph, child lymph, vaccine lymph, in the inoculated cornea of rabbits, and other vaccinal material. A number of authorities believe that these are the actual virus, or a phase of it, and there is experimental evidence to support this view.

From the practical standpoint, the much discussed question of compulsory vaccination against smallpox is most important. In England compulsion has been greatly damaged by the conscientious objection feature. In the United States a recent study<sup>3</sup> has been made of the question. Only 10 of our states, with a population of approximately 32¼ million—slightly less than one-fourth of the total population—have compulsory vaccination, and in them the case rate is only 6.6 per 100,000. Six states, with a population of approximately 18 million, have local option, with a case rate of 51.3 per 100,000. Twenty-nine states, with a population of approximately 60 million, have no vaccination laws, and in them the case rate is 66.7 per 100,000, while in 4 states, with a population of approximately 4 million, compulsory vaccination is prohibited. The case rate in them is 115.2 per 100,000.

We have been for a number of years quoting the figures given in textbooks on hygiene showing the great difference in cases as well as deaths in countries with compulsory vaccination and those without. The figures just quoted are fresh and taken from our home population. Surely they do not need argument or elaboration to prove the value (1) of vaccination, and (2) of compulsory vaccination in childhood.

#### REFERENCES

1. *J. Roy. San. Inst.*, 53:134-8, 1932.
2. McSweeney, Christopher J. *Variola Minor: Its Diagnosis and Control*, *Pub. Health*, Sept., 1932, pp. 366-370.
3. Woodward, S. B., and Feemster, Roy F., *The Relation of Smallpox Morbidity to Vaccination Laws*, *New Eng. J. Med.*, Feb. 9, 1933, pp. 317-318.

#### A NEW JOURNAL

THE first issue of *The Health Officers' World*, the official publication of the International Society of Medical Health Officers, dated January, 1933, has just made its appearance. It is under the editorial management of Dr. John P. Koehler, with Dr. James Roberts, of Hamilton, Ontario, as Associate, and published at 505 West Cherry Street, Milwaukee, Wis. It is proposed to publish 4 issues a year. The first number is largely taken up with explaining the reason for this publication, which is called a "bulletin" in some places. It is well printed. We wish the Society and its publication success.

**Employed Boys and Girls in Milwaukee**—In 1920, there were 4,617 employment certificates issued in Milwaukee to children of 14 and 15 years, and 1,190 to children of 16 years who went to work during school hours for the first time. Corresponding figures for the 12 months ended December, 1924, showed 1,926 and 1,080 certificates respectively. In 1925, there were 8,930 employed boys and girls enrolled in vocational schools from 14 to 18, inclusive.

Special tables show the nature of the first occupation and the occupation at the time of inquiry. In 1925, manufacturing and mechanical industries included 2,140 boys and 2,180 girls; transportation, trade, and clerical, 1,348 boys and 1,033 girls. (The report contains a considerable amount of statistical and other information concerning work relationships of these minors in a city where there are rather advanced regulations concerning the age and nature of employment and apprenticeship.)—Alice Channing, *Publication No. 213*, U. S. Children's Bureau, Washington, D. C., 1932.

E. R. H.

**Division of Industrial Hygiene, Ontario Department of Health, 1931**—In this *Annual Report*, the Workmen's Compensation Board referred for diagnosis, during the year, to the Division of Industrial Hygiene, 141 cases of alleged silicosis and 32 cases of lead poisoning.

Surveys were made of workers exposed to dust involving 450 examinations with X-rays in connection with grinding, polishing, porcelain manufacturing, moulding, and the preparation of abrasive cleaners.

A small group of workmen in batch rooms of glass bottle manufacturing were examined. These handled sand, lime, and soda ash. Despite the fact that exposure was high and for periods

as long as 9 years, only early lung changes due to silica were present.

In a group of 12 men preparing abrasive cleaner, all for 9 years or more, with heavy exposure to silica and alkali, there were but 2 cases of early silicosis and 2 cases of tuberculosis—1 of them moderately advanced after 17 years. "The findings in these groups suggest that simultaneous exposure to silica and alkali can take place without the rapid development of silicosis which has been reported elsewhere."

Workers exposed to a high concentration of gypsum dust showed no increased fibrosis of importance. Of 8 men exposed to asbestos dust, 3 showed minor lung fibrosis and 1 moderately advanced with no tuberculosis—the longest exposure being 11 years.

Benzol poisoning in the process of doping in patent leather manufacture resulted in 2 deaths and 2 cases with recovery; 3 workmen suffered minor effects; concentration of benzol in the dope as used was 47 per cent.

Bakelite dust, a condensation product of phenol and formaldehyde, showed no abnormality in eye examinations. Perionychia was observed in girls plucking chickens.

The 6 major causes of death—heart disease, tuberculosis, cancer, accidents, pneumonia, and Bright's disease—should be investigated, not in hospitals and clinics, but among comparatively well people, for whom plant medical service provides an opportunity.—J. Grant Cunningham, pp. 47–49 (see citation above), 1932. E. R. H.

**Cautionary Notices**—The British Department of Factory Inspection provides a considerable series of official cautionary notices to be displayed in workplaces and explained to employees. The following are examples:

*Dermatitis* (Form 367, April, 1928)—A placard illustrated with two half-tones; prevention, removal of stain from the skin, cure.

*Dermatitis* (Form 355, May, 1928)—A general notice describing dermatitis, its ordinary prevention and cure.

*The effects of chrome on the skin* (Form 398, Aug., 1930)—Chrome holes, chrome ulcers, precautions, dermatitis, effects on the nose, a recommended ointment, also a recommended nose wash.

*Effects of lemon and orange peeling on the skin* (Form 396, July, 1931)—"Acid holes" from the juice of these fruits, preventive measures before, during, and after work, recommended ointment, also water-proof plaster.

*Hides and skins regulations, 1921* (Form 982a, Jan., 1922)—Warning to workmen concerning open cuts, scratches, pimples, etc., sticking plasters, care of hands and nails, food, and clothing.

*Anthrax* (Form 410, Jan., 1932)—Large placard carrying 9 reproductions in color of the development of anthrax infection in the skin from the first to the fifth days, with a description of the disease, its source, precautions about breathing and swallowing dusts of infected materials, and use of serum; also, addresses of agents supplying serum.

*Celluloid fire dangers* (Form 987, Jan., 1928)—Warning to workers and methods of control.

*Carbon monoxide (CO) poisoning* (Form 932, Oct., 1931)—Description of the gas, sources of poisoning, symptoms, first aid, artificial respiration by the Shafer method, with a reviving apparatus (illustrated).

*Dangers from gassing or burns* (Form 395, Jan., 1927)—Chemical regulations, breathing apparatus and life-belt, symptoms, general treatment; special treatment in the case of nitrous fumes, chlorine, sulphurous fumes, sulphuretted hydrogen, benzene and similar volatile bodies, carbon monoxide or producer gas, carbon dioxide. Also, how to apply artificial respiration by the Shafer method, with oxygen apparatus. Also, chemical burns of the skin and of the eye. Splashes of anilin or nitro-benzene.

The above may be secured at a price of a few cents each from the British Library of Information, 270 Madison Ave., New York, N. Y. E. R. H.

**The Equivalent Temperature of a Room and Its Measurement**—The author proposes the name "equivalent temperature" for the combined effects of dry-bulb temperature and radiant temperature present at any particular

point, and gives a description with illustrations of the eupatheoscope, a form of radiometer devised to record this combined or true temperature.

The author finds that neither the kata-thermometer nor the effective temperature renders a true report of the sensation effect as found by the eupatheoscope. The eupatheostat is an automaton for regulating the heating of a room or space.

With the instrument, the author finds that, at 65° F. equivalent temperature, the average skin temperature is then accurately 75° F. A sedentary worker, with his output of 17½ B.t.u. per sq. ft. per hr., finds comfort in an equivalent temperature of 65° F., while a man engaged on light industrial work may lose heat at twice this rate and be comfortable in an equivalent temperature of 55° F.—A. F. Dufton, *Technical Paper No. 13*, 9 pp., Building Research, H. M. Stationery Office, 1932. Procurable from British Library of Information, 270 Madison Avenue, New York, price 6d net. E. R. H.

**Cyanide Poisoning in San Francisco**—After describing 3 case reports illustrating the unsatisfactory methods now empirically followed in the emergency treatment of acute cyanide poisoning, a new treatment was used at the Park Emergency Hospital, which undoubtedly saved the life of the young man in question.

On September 5, 1932, the victim was brought to the hospital by friends who stated that he had taken poison and told them of it immediately thereafter. On admission he was comatose; showed spasms of the voluntary muscles with moderate opisthotonos and extreme hypertension of the hands and feet, the pupils were contracted and sluggish in their reaction to light; respiration was slow and regular. There was a bright vermilion hue to the lips and a peculiar odor (simulating



paraldehyde or chloral) of the breath. Gastric lavage with sodium bichromate was begun. The washings had the odor of cyanide.

An intravenous injection of 50 c.c. of a 1 per cent sterile aqueous solution of methylene blue (methylthionine chloride, U.S.P.), was begun. "Within a very short time, voluntary movements were noted, and before 5 minutes had elapsed, the man was conscious and appeared to be essentially normal except for a severe chill and an apparent flushing. Recovery was complete within 15 minutes."

An analysis of the gastric content corresponded reasonably closely with the patient's statement that he had taken 15 grains of potassium cyanide in about 4 ounces of water.

The use of methylene blue and other dyes in the study of biologic oxidation and reduction processes is not entirely new. Warburg began an extensive study years ago, publishing reports as early as 1910, and is still investigating the subject. The favorable reaction noted in animals by others prompted Hanzlik and Leake to recommend this treatment.

There is also evidence in the literature to warrant the use of methylene blue in carbon monoxide poisoning.—J. C. Geiger, *J.A.M.A.*, 99, 23:1944-5 (Dec. 3), 1932. E. R. H.

"Pneumoconiosis"—This is a special bibliography of works published up to December, 1931, on the general physiology and pathology, clinical pathology, and radiology of pneumoconiosis. The publication is intended as a preliminary step leading toward the compilation of a full bibliography.—Procurable from World Peace Foundation, 40 Mt. Vernon St., Boston, Mass. E. R. H.

"Occupation and Health"—Brochures No. 303 to 315 in this

Encyclopaedia of Hygiene, Pathology and Social Welfare, have now appeared, completing the subjects to be covered through the letter "O."

This group of Brochures includes the following: Paper Industry, Perfume and Essence Industry, Phenols, Photo-Engraving, Seamen (Pathology and Hygiene of), Silos (Work in), Sodium, Straw, Sulphur, Tantalum, Ultramarine, Vocational Guidance and Selection, and Welding, Autogenous.—International Labour Office, Geneva, 1932. Procurable from the World Peace Foundation, 40 Mt. Vernon St., Boston, Mass. E. R. H.

#### Alternating Current Precipitators for Sanitary Air Analysis—

1. An inexpensive precipitator unit.—Philip Drinker.

By the use of a luminous tube transformer intended for operating neon signs a simple inexpensive electric precipitator has been built. The total cost of this precipitator is slightly less than \$30.

2. Acid Formation in Electric Precipitators.—W. G. Hazard and T. Ishikawa.

The authors found that acids of nitrogen were formed in electric dust precipitators when the voltage, rate of air flow and tube diameter were within certain limits. This may invalidate determinations when chemical methods of estimation are used. Adjustment of the previously mentioned factors will serve to eliminate the errors of acid formation. *J. Indust. Hyg.*, XIV, 9:364-370, 1932. L. G.

Toxicity of Dichlorotetrafluoroethane—Dichlorotetrafluoroethane ( $\text{C}_2\text{Cl}_2\text{F}_4$ ) is one of the newer chemical compounds which, because of its properties, is suitable for use as a refrigerant gas. In the present study dogs and guinea pigs were exposed to 20, 15, and 14.16 per cent concentra-

tions of the gas in one of the gassing chambers of the U. S. Bureau of Mines. On exposure to the 20 per cent vapor, generalized tremors, intermittent convulsions and finally exhaustion took place, while the exposure to 15 and 14.16 per cent concentrations caused some incoördination, generalized tremors, and occasional convulsions, which disappeared after three to five exposures to the gas.

With cessation of exposure of dogs to the 20 per cent concentration for a single 8-hour period rapid and complete recovery took place; death followed longer exposures than this. Guinea pigs, on the contrary, were not seriously affected by four 8-hour exposures or one 24-hour exposure to this concentration of the vapor.

In contrast with the 20 per cent concentration the 15 and 14.16 concentrations led to the development of a high degree of tolerance in dogs after three or five consecutive 8-hour daily exposures. No deaths occurred during 21 consecutive exposures at this concentration. For details concerning the

blood changes and pathology the reader is referred to the original contribution.

It is concluded that dichlorotetrafluoroethane is an organic vapor of remarkably low toxicity.—W. P. Yant, H. H. Schrenk and F. A. Patty—U. S. Bureau of Mines *Reports of Investigations* 3185.

L. G.

**Protection Against Mercury Vapor Afforded by Cannister Gas Masks**—Two charcoal filled gas-mask cannisters, three type N gas-mask cannisters and two charcoal filled respirator cartridges were tested to determine their protective efficiency against mercury vapor. The concentration of vapor was 42.5 p.p.m. by volume.

The charcoal filled cannisters had a life of 112 and 117 minutes, the three type N cannisters ranged from approximately 15–36 hours while the respirator cartridges has a life of only 2 minutes. Rest intervals increased the useful life of the cannisters.—W. P. Yant and C. E. Traubert—U. S. Bureau of Mines *Reports of Investigations* 3187.

L. G.

## FOOD AND NUTRITION

**Soft Curd Milk**—Hill in 1928 (*Bull.* 227, Utah Exper. Sta.) reported a test for measuring the difference in toughness of curds in cow's milk. Any milk with a curd tension of less than 30 gm. he called "soft curd milk" and all above 30 gm. "hard curd milk." This standard has been adopted by the New York City Health Department.

It has been suggested that soft curd milk is better tolerated by infants than is hard curd milk, and this is the report of an experiment carried out at Bellevue Hospital. Eighty-two infants, under 1 year of age, over 90 per cent of them under 6 months, were selected at random except that preference was

given to small and underweight infants. The infants received soft curd milk for a period of from 10 to 90 days with an average of 21 days.

After the milk had been in the infant's stomach for 15, 30, and 60 minutes, the size and consistency of the curds were compared with those in the curds from certified milk (boiled and unboiled), evaporated milk and breast milk. Contrary to previous findings by Hill, soft curd milk showed a higher percentage of hard curds than did boiled milk. The curds were softer than those after taking unboiled certified milk, about equal in size to those of boiled milk, but larger and tougher

than those of evaporated or breast milk.

In this group of infants receiving soft curd milk instead of ordinary certified milk, 54, or 65 per cent, gained weight at the expected rate of healthy babies. The average caloric intake for these babies was 61 calories per lb. Twenty-one babies lost weight and the average caloric intake was 51 calories per lb. The chief cause of failure to gain was vomiting and diarrhea. Soft curd milk was of no special value in preventing or treating vomiting and diarrhea. It was shown that soft curd milk has no decided advantage over other certified milks in its digestibility. The infants given soft curd milk needed a higher caloric intake than those given other milks—Herbert L. Elias, *Am. J. Dis. Child.*, 44:296 (Aug.), 1932.

**The Antirachitic Potency of Eggs from Hens Receiving Massive Doses of Activated Ergosterol**—Fifteen Leghorn pullets receiving a normal ration were used in this experiment. They were kept away from the sunlight and received the ration from January 20 to March 17. During the last week, the eggs were collected for testing.

On March 18, 2 per cent of cod liver oil which was contained in the ration was replaced by 2 per cent of maize oil solution of activated ergosterol. After the birds received this dosage of vitamin D for 6 weeks, the eggs were again collected for testing. The egg yolk oil from the pullets receiving the cod liver oil had a vitamin D coefficient of 0.7.

The substitution of an irradiated ergosterol 10,000 times as potent as the cod liver oil resulted in an increase of only 185-times in the antirachitic value of the egg, indicating that the birds did not transfer the vitamin to the yolk efficiently. During the administration of the ergosterol the pullets lost about 20 per cent in weight and the general appearance was poor.

On continuing the administration of 2 per cent of 10,000 $\times$  activated ergosterol solution for an additional 44 days, a further decrease in weight and egg production was noted. Three birds died and only 43 eggs were laid. The egg yolk oil from the pullets receiving the ergosterol was administered to baby chicks at levels equivalent to 2 per cent, and to 25 per cent of cod liver oil. It was found to be less effective than 2 per cent of cod liver oil for preventing leg weakness in chickens.

Additional experiments are being carried out to determine whether the source of vitamin D available to laying birds determines the antirachitic value of the vitamin D that will be stored in the egg.—Francis G. McDonald and O. N. Massengale, *J. Biol. Chem.* 99:79 (Dec.), 1932.

**Studies on Vitamin G (B<sub>2</sub>) With Special Reference to Protein Intake**—Most of the work on the nutritional treatment of pellagra has been in connection with vitamin G, following the work of Goldberger and his associates. The suggestion that protein bears a relation to this problem is responsible for undertaking experiments recorded here.

Vitamin G was prepared from ground whole wheat with extraction of 84.5 per cent alcohol by weight. The dried residue was incorporated in the diet so that 1 kilo contained the extract from 500 gm. of wheat. Protein at 6, 12, and 18 per cent levels was fed, the protein being derived in one series from casein previously extracted with alcohol and in the second from milk powder plus extracted casein. The only source of vitamin B, except that naturally present in the animal, came from the wheat extract.

In both series of protein variations the average growth increased with the protein intake, the differences between the 6 and 12 per cent levels being much

greater than between the 12 and 18 per cent.

An additional experiment on 6 per cent protein containing an excess of vitamin G as protein-free milk showed a much higher growth rate than any of the others.

The authors conclude that while pellagra conditions indicate symptoms of vitamin G shortage, the vitamin deficiency should not be regarded as the sole factor but that the relation of the protein supply should also be taken into consideration.—H. C. Sherman, and I. A. Derbigny, *J. Biol. Chem.* 99:165 (Dec.), 1932.

**Vitamin C Content of Frozen Orange Juice**—Stored orange juice has been tested both chemically and biologically to determine whether there is a deterioration of the vitamin in freezing, during storage, and whether atmospheric oxygen influences its stability in either process.

The extracted juice was prepared in 3 ways, in air and freezing under air head spaces, in nitrogen and freezing under nitrogen, and extraction in air and freezing under oxygen, the first 2 methods comparing with the ordinary commercial practice.

The juice of Florida Valencia oranges was placed in ampules, frozen and stored. Assays were begun shortly after the juice was frozen and then compared with the results obtained from the juice stored 10 months. One and one-half c.c. of the juice preparations were given daily compared with the same amount of fresh juice from reserve oranges, while another group received no vitamin C. The average survival of the negative controls was 26 days with symptoms of scurvy showing before 2 weeks. There was scurvy evidence on post-mortem. No significant difference in growth was observed between fresh juice or any of the 3 types of fresh frozen juices. There was no difference

between the tests using fresh frozen juice and that using the frozen juice stored for 10 months.

To determine the antiscorbutic potency of the preparations, 0.01 N solution of 2, 6-dichlorophenol-indophenol was used to titrate portions of the juice with this dye after neutralizing with sodium acetate. Titrations showed some difference between the juices frozen under nitrogen, oxygen and air respectively. The orange juice was further treated to isolate the reducing substances. The reducing concentrate was diluted with water so that 0.5 c.c. had a reducing value equivalent to 2 c.c. of orange juice as determined by titration. Glucic acid with a reducing property similar to that of hexuronic acid was dissolved in water so that 0.5 c.c. portion contained 2 mg. of the acid. By titration this amount was equivalent in reducing value to about 7 c.c. of orange juice. On feeding this amount to guinea pigs the animals on glucic acid as well as the negative controls developed scurvy; post-mortem showed all animals in these groups to have severe scurvy.

Another group received 5 c.c. of diluted orange juice concentrate. The orange juice and the juice concentrate groups were in excellent condition at the end of 5 weeks when the supply of juice and concentrate was exhausted. While the colorimetric titration in orange juice may be a useful guide as to vitamin C potency, there are apt to be present in plant material reducing substances having no antiscorbutic value.—E. M. Nelson and H. H. Mottern, *J. Indust. & Eng. Chem.* 25:216 (Feb.), 1933.

**The Nutritive Value and Efficiency of Mineralized Milk**—Whole milk mineralized with iron, copper and manganese was fed to male rats 21 days old. These elements were added as solutions of  $\text{FeCl}_3$ ,  $\text{CuSO}_4$ , and  $\text{MnCl}_2$

so that 30 c.c. of milk contained 0.5 mg. Fe, 0.05 mg. Cu, and 0.04 mg. Mn. The rats grew from 60 to 200 gm. in 36 days, or an average daily gain of 3.9 gm. which is similar to the gain made by rats on an ordinary ration. Only 2.25 gm. of milk solids were necessary to produce 1 gm. of gain in weight.

A similar experiment was made with pigs. Ten young Yorkshire pigs were used. A solution containing 50 mg. Fe as  $\text{FeCl}_3$ , 5 mg. Cu as  $\text{CuSO}_4$ , and 5 mg. Mn as  $\text{MnCl}_2$  was added daily to the milk given each pig. Twenty-five c.c. cod liver oil were given once a week to insure vitamin D. The pigs were weighed every 4 weeks, and made a daily gain of 1.26 lb. over a period of 16 weeks. Only 1.97 lb. of milk solids were necessary to produce 1 lb. gain in weights, while 3.53 lb. of the standard ration were necessary for the same gain.

In this paper the authors have merely demonstrated the possible importance of mineralized milk in experimental work, and have suggested that if the mineralization of milk is to be used under practical conditions the simplest and most efficient method of supplying these elements must be worked out in the future.—A. R. Kemmerer, C. A. Elvehjem, E. B. Hart, and J. M. Fargo, *Am. J. Physiol.* 102:319 (Nov. 1), 1932.

**Pasteurization of Milk Artificially Infected With Two Strains of *Brucella Suis***—Investigations of recent years have shown that cattle may be infected spontaneously or artificially with *Brucella* strains of the porcine type, that porcine strains may become established in the mammary glands of cows and be eliminated in the milk, and that *Brucella suis* may be isolated from the blood of undulant fever patients. The susceptibility of cattle and man to porcine *Brucella* suggests the possible occurrence of a milk-borne, porcine

*Brucella* infection in man, and emphasizes the importance of determining the thermal death time of different strains of *Brucella suis* in order to appraise the reliability of milk pasteurization standards in the prevention of these infections.

Reported studies on the thermal death time of *Brucella* strains indicate that a temperature of 140° F. for a shorter time than that presented for pasteurization renders *Brucella* non-viable, but indicate that porcine strains are more resistant than bovine or caprine varieties.

The authors have studied the heat resistance of two strains of porcine *Brucella* in samples of milk in cotton-stoppered tubes and hermetically sealed glass tubes. Samples of whole and skim milk in cotton-stoppered tubes with a content of *Brucella* organisms ranging in the various tests from 5,000 to 500,000,000 per c.c. were subjected to a temperature of 144° F. for 30 minutes. Samples of whole milk in hermetically sealed glass tubes with a content of 100,000,000 *Brucella* organisms per c.c. were subjected to a temperature of 144° F. for varying periods of time ranging from 2 to 30 minutes, and similar samples with a content of 500,000,000 organisms per c.c. were subjected to temperatures of 134, 140, 142, and 144° F. for the same time intervals.

Results of these tests show that the strains tested are more resistant to heat in cotton-stoppered tubes of milk than in hermetically sealed glass tubes. In the former, *Brucella suis* survived 30 minutes at 144° F. in milk containing 10,000,000 to 500,000,000 organisms per c.c. but the same period of time and same temperature destroyed *Brucella suis* in milk containing from 5,000 to 1,000,000 organisms per c.c. Both strains of *Brucella suis* in hermetically sealed glass tubes of whole milk containing 500,000,000 organisms per c.c.

were non-viable after 20 minutes at 140° F., after 15 minutes at 142° F., and after 7 minutes at 144° F.

The authors suggest that the resistance of the organisms in cotton-stoppered tubes may be due to the formation of a dry film in which the organisms survive, this film not being formed in the sealed tube.

It appears that the thermal death time is influenced by the degree of contamination.

The authors cite the work of other

investigators which tends to show that the number of organisms encountered in milk is relatively small in comparison with the massive inoculations used in this experimental work. The data obtained suggest to the authors that efficient pasteurization will prevent milk-borne porcine brucellosis, but they withhold final conclusions pending results of studies on commercial pasteurizers.—S. E. Park, Robert Graham, M. J. Prucha, and J. M. Brannon, *J. Bact.*, 24:461 (Dec.), 1932.

## CHILD HYGIENE

### PARENTAL EDUCATION AND CHILD HYGIENE

WE are reminded constantly that organizations and technics of themselves cannot accomplish results in the child health field. Application depends upon the knowledge and active participation of parents and children. This is well illustrated in the infant welfare movement in this country and abroad. The mothers have been taught by public health nurses, and with simply-worded literature, to take advantage of the public health facilities and apply them to the individual child.

Considerable advances have been made in the physical care of the child. It remains to extend the same principles to cover its mental development. In a most challenging recent book on parental education\* Mrs. Gruenberg has laid down certain governing principles.

The most obvious and the most widely accepted educational service for parents has to do with the physical care of children. So completely has the present generation of adults accepted its dependence upon a variety of experts for assistance in the physical care of children that this kind of help is often

quite overlooked when people think of parent education. When a mother gets advice on her own diet while nursing her infant, that is all in the day's work for the nurse or the pediatrician. When, years later, she obtains from other adults (who have perhaps had more experience) counsel on the management of that same child, that is parent education. But in all essential respects the former is quite as much "parent education" as the latter.

Similarly we have accepted the lectures and radio talks and printed matter on the hours of sleep or the treatment of scratches and burns without labeling the valuable instruction as "parent education." We have merely taken such help on the common-sense ground that it enables us to do our work more effectively. There are better ways of managing our affairs, as parents; and we want to find out what those better ways are. We have accepted the principle, then, that everything helpful to such better ways is parent education.

The symposium which appears in this volume is composed of short chapters written by leaders in their respective fields and covers practically every phase of child growth and development, and the relation of the child to the home, school, and broader contacts of the outside world. If one has not been convinced already that parental education as an integral part of adult education

\* *Our Children*, a handbook for parents, by Dorothy Canfield Fisher and Sidonie Matsner Gruenberg. Prepared and sponsored by the Child Study Association of America, 1932.

is vital to the physical and mental well-being of the child, a perusal of this book will remove any doubts.

As a background to this and similar efforts in parental education, it is enlightening to trace the history of parent associations in this country. This has been sketched in *A Contribution to the Theory and Practice of Parents Associations*,\* which is a discussion based on a 5-year experiment made by the United Parents Association of New York City from 1925 to 1931.

In the foreword Mr. Lindeman cogently says that

... modern parents are perturbed because they find themselves incapable of exercising the functions of parenthood on the basis of either native equipment or traditional knowledge. They find that their very young children need a kind of attention which calls for new knowledge and fresh comprehension. They also discover that the influences which play upon their developing children in dominant fashion originate, not within the family group, but in the surrounding community and its institutions. The most important of these institutions is, of course, the school. Approximately twenty million American children spend from 4 to 8 hours each day away from home and at school. These hours away from home and family are filled with stimulations which combine to form the child's personality. Parents have come to realize that they can only become effective in their parental rôles if they understand and collaborate with the institution which plays so significant a part in the development of their children, namely, the school. But, how is such understanding to be acquired and by what means is such collaboration to be achieved?

An attempt has been made to answer this question by the experiment sponsored by the United Parents Associations of New York City.

In 1925 the Executive Committee of the United Parents Associations of New York City formulated the theory that this new knowledge would produce most desirable results in social action if it were disseminated in such a way that the two institutions most pro-

foundly influential in the child's development, the home and the school, felt its impact simultaneously. As a corollary of that theory, it followed that Parent-Teacher Associations should be a medium for "parent education." . . . It is apparent to any one who carefully studies the parent-teacher movement that it has potential possibilities for playing a significant part in our present complex civilization. But the problems connected with converting those potentialities into reality are not simple and are not to be solved by rule-of-thumb methods or mere common sense.

Where is the growing individual to find interpretation and integration? Some psychologists answer these questions by saying that only the parents' influence is sufficiently continuous to guide the child toward a philosophy and to resolve the contradictions in his environment; that the home is the only place where he can feel secure and retire from the world to refresh his powers.

But in too many cases today parents have no educational technic for undertaking this delicate adjustment. Too many parents for lack of training ignore the child's problems or meet his questions with indifference or hostility. The psychologists contend that such ignorance on the part of parents results in much of the maladjustment and unhappiness which are a matter of common observation in so-called normal human life today and that it is possible that many of the extreme neurotic and psychopathic conditions which send people to reformatories, insane asylums, prisons and divorce courts, may be traced to the parents' lack of understanding and skill.

A most important point is stressed in discussing the application of modern psychology to the formal education of our children. The report states that

... although it is true that to date the findings of modern psychology have not revolutionized our school systems, public or private, minor changes in theory and some changes in practice have resulted. All of these point to the necessity for parent education. It is becoming apparent to the professionals in charge that a narrow concept of education, designed largely to prepare children for material success and based on drilling them in facts, involves stultification of individual values and does not fit them for creative participation in the great variety of possibilities inherent in human life. Therefore, the course of study in the new type of "progressive" school is attempting to deal not only with facts but also with free expression and development of individual

\* By Maria Lambin Rogers with a foreword by Eduard C. Lindeman. Printed for the United Parents Associations of New York City by The Curative Workshop, 28 East 21st Street.

interests and curiosities. This broadened conception of education requires that principals and teachers know the whole child, a desideratum made possible only through the interest and support of the educated parent.

Certain principles of method are laid down for the conduct of mothers' clubs or parent-teacher associations. These are listed as follows:

"The first of these was that the parents in each school form the logical groups through which to work inasmuch as group learning, when attitudes are to be changed, is more effective than individual learning.

"Second, the results of group learning register themselves automatically in the conduct of any institution of which the group is a functional part.

"A third principle was that the autonomy of these groups must be kept inviolate.

"A fourth principle was that such energies and powers as the individual possesses will not develop in a cramped atmosphere where values are rigid and authoritatively determined.

"A fifth principle was that leadership for every parents association should be drawn from the local community.

"A sixth principle was that such alert and well-trained groups exert the maximum influence in the community if united in a federation.

"A seventh principle was that the work of the federation should not duplicate the work of any other organization in New York City, where so many agencies are concerned with civic welfare.

"An eighth principle was that the policies and work of the federation should be guided by the experience of the experts in the field of social science and that it should affiliate with these experts and give them influence in every possible way.

"A ninth principle was that the federation should be city-wide in character and should be representative of all

the organized parents of the city, both in private and public schools. It has, therefore, accepted for membership Parent-Teacher Associations, Mothers' Clubs or Kindergarten Mothers' Clubs, organized in connection with any school, private or public. It has encouraged the representatives of the private schools to take as active a part in the central federation organization as is taken by the representatives of the public schools."

In laying out an immediate program for the next 5 years the United Parents Associations have grouped their activities under 4 main headings:

I. Coördination of the work of the member associations;

II. Establishment and maintenance of needed services;

III. Building of prestige for parent opinion;

IV. Conservation and evaluation of experience and study of community conditions.

Under the coördination of the work of member associations the following are mentioned:

"A. The School Lunch Committee is to continue with its present program until its objective of adequate school lunch service is attained, which should be within the 5-year period.

"B. The After School Athletic Center Committee is to continue its present program until its objective of adequate supervised play service for children of the elementary schools is attained, which should be within the 5-year period.

"C. Fresh studies of the type made by the School Lunch Committee are to be undertaken. Three promising fields for those studies are: 1. Health service in the schools; 2. Vocational guidance in junior high schools; 3. Mental hygiene clinics for elementary schools. As far as is feasible, preference shall be given to studies popular with the member associations.

"D. The Open School Week Committee is to continue its present activi-



ties. These are to remain a recommended project for member associations.

"E. Early Registration is to continue as a suggested project for member associations when the principal welcomes the help of the association in this work.

"F. A qualitative standard of admission for member associations is to be considered, covering the organization methods and program of activities of the association. These should probably be required to conform to the objective of parental education."

## PUBLIC HEALTH NURSING\*

**Public Health Nurses Take Stock**—All public services these days are having to give an accounting of themselves. Public health nursing is no exception. This accounting must show that the service is too valuable to be eliminated; also that the best quality of service is being given for the least possible cost.

The first problem then is to make the public health nursing service indispensable to the consuming public. The only way the public can know our objectives and the plans we have for realizing them is to share actively in a partnership service.

I saw an excellent example of this working partnership in a very rural county that had a nurse with unusual vision. For 3 years the service had developed under her leadership with everyone in the county participating actively—teachers, the P.T.A. groups, women's clubs, men's groups, children—all helping on some project during the course of the year. When a clinic was held for the removal of tonsils, for example, the local paper wrote it up as "our clinic" listing the people who had helped. That list was an interesting one, for it included almost everyone in the community, from the minister who was orderly, to the local physicians who cooperated actively, the teachers who scrubbed instruments, the women who assembled supplies, and the children who ran errands. The third summer while the nurse was away on vacation the bank failed in which much of the community's money was kept, and the county commissioners' meeting hurriedly decided to

cut all taxes for the following year as much as possible. Among other expenditures they eliminated the nurse's salary. When this was noised abroad the people protested, organized a citizens committee of the largest taxpayers to meet the commissioners, and finally succeeded in persuading them to put the nursing budget back in the county appropriation. This all happened, as I have said, while the nurse was away on vacation. Much to her surprise on her return she learned that she had lost and regained her position, but much more significant and valuable to her was the evidence that she had developed a real local leadership which would outlast her stay.

Our accounting should start then with a study of our methods and program of work in relation to volunteer service remembering that real progress in public health will come not through what we as professional people know and do but through what we can get others to do for themselves. We must give due credit also for the actual work which these volunteers accomplish. Few communities are able to afford enough public health nurses to develop an adequate program. There is so much that can be adequately done by intelligent lay people.

Every public health nurse should ask herself these questions:

1. What am I doing which does not necessitate a nurse's training?
2. How much that I do can safely be delegated to others?
3. Do I share responsibility for planning and joy of accomplishment?
4. Do I remember to make the work interesting and vital to volunteers?

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

The second problem, so magnified in these years, is to give the best quality of service for the least money.

The first question we must answer is:

Is our program based on community needs?

A recent investigator of nursing services reports that the majority of nurses whom she visited (picked because they represented current field practice) could not answer such fundamental questions as these in relation to their own work: the population of the territory served, the annual birth and death rates, the number of babies dying under 1 month and 1 year of age, the number of mothers dying from puerperal causes, the leading causes of local deaths, and the relationship of these facts to the nursing service. How can you justify the cost of your day's work to your community when you neither know the local needs nor are able to measure your accomplishments in terms of those needs?

The administration of the service must be justified also. Both the nurse and her lay board and committees must decide whether they can afford a highly specialized service to one special age or disease group or whether the service should be generalized service on a family basis with more economical administration, by having all similar groups coordinated in one organization.

The question must be answered. "Have all unproductive costs been reduced as far as possible?"

The nurse should lead the way in helping the community to see for what health needs they should provide and how far they fall short. The appraisal forms published by the National Organization for Public Health Nursing and the American Public Health Association set up standards for accomplishments.

How close does the community come to meeting these standards? What plan can we make for the next 10 years which will insure each succeeding year a service which will more nearly meet these standards?

Not only must the administrative and financial program be analyzed but the

professional details of each day's work need scrutiny. Does each visit of every day justify itself in results attained? Why are some families uncoöperative? How many repeat visits are profitable when our funds limit the extent of our service?

Do we study records in the light of our successes and failures and make plans accordingly? Do we plan each visit carefully and afterwards critically appraise it?

The public health nurses, more fortunate than other nursing groups, are better organized, more regularly employed and more accustomed to working with lay groups. They then should assume leadership in their communities in analyzing professional problems other than those involved in their day's work. Is your community aware of the oversupply and under employment of nurses? Are they making plans so that all those who are sick can receive the services of nurses who need work at a price satisfactory to both parties? Do high school girls know the facts about nursing as a vocation? Do teachers and vocational advisers know that only their best graduates are welcome in the nursing schools?

Certainly at no time than when we are facing problems like these have we greater need of our national organizations. The American Nurses' Association and the National Organization for Public Health Nursing are making studies, giving us standards by which to measure our accomplishments and fighting for rights which affect every one of us as individuals in a profession which is striving to develop an increasingly superior service.

They need our support in membership and in subscriptions to the magazines.

Out of this period of economic stringency, the nursing profession can, if it will, develop a quality of service far superior to that which it has rendered in the past; but it will ac-

comply this only as we all resolve to give to each hour of every working day the most intelligent, thoughtful quality of service that we are capable of—setting up within ourselves standards of work which will be satisfied only with our best, and developing a habit of planning, questioning, and measuring all that we do in terms of meeting the concrete needs of *our* community.

Katharine Faville, R.N. Problems in Public Health Nursing, *Pub. Health*, Michigan Department of Health, XX, 12:267-275 (Dec.), 1932. V. A. J.

**Health Integration in High School**—Public health nurses are always searching for ways of integrating health with other subjects so that they may give helpful suggestions to teachers. Especially precious are suggestions for integration in high schools where each special teacher has a particular angle from which she may approach health teaching.

Two helpful suggestions come from Great Neck, N. Y., a town of 5,000 people where everyone seems to be enrolled in the Health League, if not as a member at least as a coworker with the community public health nurses.

The teacher of sewing had a style expert from the city come out and talk to the girls on good taste in girls' clothes. The gym teacher called in an expert beauty specialist who told the girls that exercise and fresh air would give them sparkling eyes and red cheeks and that nothing was so ridiculous as a young girl trying to appear like a society woman—unless it was the society woman trying to appear a young girl.

These methods were effective because they conform to the principles of adolescent psychology. The high school boy or girl wants to know the truth, but he wants to make some investigation himself and then draw his own conclusions. These boys and girls want advice, but they do not want advice which is based on sentiment or which is threatening. There must be a clear, logical reason behind it. The adolescent is anxious for a philosophy which will

guide and direct his social activities so he may be popular and respected. He wants to be considered an individual with a personality of his own.

Health teaching based on these principles will likely receive the desired response in high school students.—

Inez Macaulay, Great Neck, N. Y., What Our Town Does to Keep Us Well. Frankwood E. Williams, *Adolescence*, 1930. D. A. Thom, *Normal Youth and Its Everyday Problems*, 1928.

V. A. J.

**An Adequate Community Nursing Service**—When the sick people in every rank of life in a community get good nursing care because all varieties of skilled, competent nurses have coördinated their work, that community may be said to have an adequate nursing service.

The medical profession and the general public, as well as the nursing group, must take a hand in the attempt to assure an adequate community nursing service.

Most people divide nurses into three groups, institutional nurses, private duty nurses, and public health nurses.

Private duty and institutional nurses often look on public health nurses as having more freedom because they have regular hours, Sundays free and a regular salary. They do not realize the mental strain involved in shifting from one household to another in the public health nurse's eight-hour day. "No really good field nurse can forget her patients just because the clock strikes four or five p.m." She cannot turn her patients over to a night nurse when she leaves the district at night. Hence she often keeps them on her mind and worries about them.

During the last few bitter years only the gratitude of the poor, the sacrifices that they so willingly make for each other, and the backing of a group of lay people just as eager as the nurse herself to ameliorate the lot of

the unfortunate, have enabled the public health nurse to carry her load.

Physicians and surgeons have been of little help to nurses in demanding minimum standards of good nursing. Nursing groups have been mostly to blame for this because they have not made the medical profession see how much nursing skill is required for certain treatments and how difficult it is to attain this skill if the student nurse has not been well instructed. Have nurses really been candid about sharing their problems with physicians? All good doctors want their patients to get the best nursing care obtainable and they also want the nurses to get a square deal.

One able surgeon who is on the executive committee of a nursing school stated that the best attending staff in the world did less to make the reputation of a hospital than the quality of its nursing service.

Nurses need better organization. Whether they do private duty, institutional or public health nursing, they should be organized under lay groups or advisory committees so that "the older nurse will be sent to those patients who need her special skill and experience, will be paid according to her ability,

and will not be expected to compete with the young graduate only a few days out of the hospital."

Behind most groups of public health nurses are keen, interested lay committees, and these committees have been able to work out standards of administration, promotion, standards of work; etc., because they were interested in having the sick poor and wage earners in the community get skilled nursing care.

Hourly nursing should be an appointment service operated by a local registry. Even private duty nurses should be organized through registries into groups graded according to their skill and experience and protected by lay committees.

Nurses must then have the backing of lay groups and physicians in making the cornerstone of their foundation the well equipped, well prepared nurse.

And nursing must show constantly such excellent results that a now somewhat inarticulate public will become vocal in its requirements for good nursing, just as a well organized community demands safe water, safe milk, or the finest type of teaching in its public school system.

Edna L. Foley. Providing an Adequate Community Nursing Service, *Mod. Hosp.*, XL, 1:83-86 (Jan.), 1933.

## EDUCATION AND PUBLICITY\*

**A Correction**—"The Full Endorsement of the Advisory Council"—In the February, 1933, *Journal*, we quoted from published statements about a New York Food and Health Exposition announced for April 3-8, 1933. Upon submitting the paragraph to the announced members of the Advisory Council we learned that the matter was under consideration only. *There was no authority for the published statement* which we quoted. Since then it has been decided not to form an advisory committee.

**Survey of Health Education**—The State Health Council of Indiana has a Survey Committee to encourage a comprehensive study of health legislation, leadership, and facilities. The various sections of the study will be carried on as personnel and funds are available. Progress has been made in the study of the qualifications of special teachers of health and physical education and of instruction methods, under the supervision of H. E. Moore, State Department of Public Instruction, Indianapolis.

**The Volunteer Worker**—Under this heading appears a tribute to the volunteer from which we quote two paragraphs:

In looking over our stock in trade and counting up our assets one thing stands out above all the rest; the fact that the foundation upon which the success of the tuberculosis movement has been built is the untiring endeavor and the unselfish expenditure of time and energy on the part of the volunteer workers.

Hundreds of volunteers; the leading business and professional man; the busiest mothers

and housewives; active members of Parent-Teacher Associations; Home Economic Clubs workers; Women's Clubs members; all organizations finding time to devote themselves to the betterment of their respective communities' health. They go to make up the township chairmen, the directors, the officers, and the members of the executive committees of our tuberculosis associations. They are the workers who unhallowed and unsung made, and though battered by the winds of adversity are continuing to make, this, the tuberculosis movement, a winning fight against disease.—

—*Hoosier Health Herald*, Indianapolis, Dec., 1932.

**Health Education in the Philippines**—An extensive plan for adult education has been announced by an Advisory Committee appointed by the Governor-General, a member of which is Dr. Jose P. Bantug, chief, Division of Public Health Education and Publicity, Bureau of Health, Manila.

Among the 21 topics suggested for lectures are the following on health: Intestinal parasites, Beriberi and balanced diet, Tuberculosis, Malaria, Infant and child care, Home Sanitation. Skin diseases.

Technical lectures on health to be delivered by insular, provincial, or municipal health officers or school Red Cross, or Puericulture Center nurses, or local doctors.

**Read "The Health Talk" If You Talk About Health**—Or if you get others to make health talks, you will wish to read "The Health Talk," by Iago Galdston, M.D. If you are chairman of a program committee, or leader or executive of any group which invites the presence of speakers on health topics you will want to read this pamphlet. But it will cause a lot of trouble for some people: you will know so much

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Routhahn, 130 East 22d St., New York, N. Y.

that will be necessary hereafter to make satisfactory health talks for your audiences. And why have a health talk, or why give one, unless it includes a reasonable proportion of the elements of a good health talk?

Here are the chapter headings: "The Nature of the Problem and the Fundamental Technique of the Health Talk"; "Curiosity, Its Application and Utility"; "Enlisting Interest"; "Imparting Information"; "Mechanics of Delivery"; "Leading to Action"; "On the Air"; "The Health Speakers Bureau"; "The Audience and the Speaker"; "Adjuncts of the Health Talk"; "Giving the Health Talk a Fitting Name." We cannot imagine anyone who talks on health who would not benefit through reading "The Health Talk." And this is one of a very small group of publications that we believe every public and private health agency should possess. Published by National Tuberculosis Association, 450 7th Ave., New York. 76 pp. 50 cents.

**Fewer Words Will Do the Job—** The address for purchasing most United States Government publications is "Superintendent of Documents, Washington, D. C." To add "Government Printing Office" merely cumbers the address. The G. P. O. is merely the printing office which prints the publications; the S. of D. is the selling agent.

Neither of the two should be given *for free publications*. Requests for *free publications* should go to the issuing department or other office.

Incidentally, there is now no "Bureau of Education"; it is called the "Office of Education," although the earlier title still appears on publications which have not been reprinted recently.

**The Discussion Leader—**Confusion as to the actual functions of a "discussion leader" was revealed at the an-

nual fall program session of the National Conference of Social Work. In this October meeting 50 to 60 leaders in social work gave half the day to consideration of reports by "observers" of the sessions at Philadelphia last June.

It was shown that often the so-called "discussion leader" was either a "commentator" on the previous address, or was an "opener" or "starter" of discussion. It was agreed that a "discussion leader" should actually "lead" or conduct audience participation, and that he should not be a speaker.

It was expected that hereafter the following quotation from the new Handbook for Chairmen of Divisions should be the ideal:

A Discussion Leader for purposes of definition is a person selected to preside during a discussion that is of a more informal character, to keep the discussion related to the subject, to stimulate thinking, and to act as a Discussant himself. This requires considerable ability and facility in handling a meeting and is an entirely different function from that of commenting on a particular paper. A Discussion Leader should be able to think quickly, cheerfully and graciously to shut off a person speaking extemporaneously from the floor on matters entirely irrelevant to the subject, to be at all times in control of the situation, and to be able from time to time to bring out the main lines of discussion or the points being made or to sum up the question at issue clearly for the benefit of the audience. Here again, careful preparation should be made.

The Discussion Leader should be advised in advance as to the purpose of the meeting and what it is hoped to bring out during the discussion. If possible, he should have access to the papers in advance of the Conference and should be permitted to make such arrangements with other individuals for participating in the discussion as he sees fit. The Division Chairman may act as the Discussion Leader but he usually has other responsibilities that prevent his careful preparation for discussion leadership. Unless the Division Chairman or Presiding Officer happens to be exceptionally skillful in leading discussion, it is wiser to select someone else as Discussion Leader (The Chairman is then free for the details of meeting management.)

In this case the distinction between the Discussant and the Discussion Leader should be clearly made to the person selected and at the appropriate time he should be presented to the audience and allowed to have full charge of that part of the meeting at his disposal.

**Public Health in "Literary Digest"**—There is always the possibility that your better publications may contain material which would appeal to the editor of *Literary Digest*. Selected reports of studies, annual reports, and other publications may be addressed to Arthur E. Bostwick, Science Editor of *Literary Digest*, Park Plaza Hotel, St. Louis, Mo. Please indicate especially interesting or significant pages.

**One Hundred New Names**—An editorial in the *Journal* (Dec., 1932) calls attention to the significant fact that on the Washington program of the A.P.H.A. "upwards of 100 new names were included as giving papers."

This is testimony to the wisdom and the energy of the various program chairmen. The easy way—repeating the same speakers year after year—is not the way of growth and progress.

#### RADIO

A successful radio talk service is maintained by the American Child Health Association, 450 7th Ave., New York. Once a month a talk is sent to 170 stations which have indicated a desire to receive the talks. Interested health agencies might check with A.C.H.A. as to use made of these talks by stations in their territory. *Copy free.*

Copies of a series of radio talks on mouth hygiene will be sent upon request to New York Department of Health, 139 Centre St., New York.

Radio talks from Illinois State Department of Health, Springfield: "Health Problems of Later Life," "Keeping Well Between 45 and 65,"

"Prime of Life and Its Health Problems," "Health Hazards of Adolescence and Early Maturity," "Sick Headache, Asthma and Hay Fever Victims," "The Healthiest Period of Life."

#### COÖPERATING GROUPS

The Massachusetts Society For Mental Hygiene, 3 Joy St., Boston, held a 3-day course on mental hygiene for Massachusetts girl scout leaders.

The Health Section of the Albany, N. Y., Council of Social Agencies has arranged a series of talks on "What The Social Worker Should Know About Disease."

"Health And Its Maintenance" is a reading list: "The Public Library Offers You These Books," says *Brookline Health Bulletin*, Brookline, Mass., Board of Health., Dec., 1932. *Sample free.*

#### NEW

*High School Health Bulletin* and *Child Health Study* are now issued in addition to *School Health Bulletin*, by Illinois Tuberculosis Assn., Springfield. All are attractively mimeographed on clear white paper of 20 lb. weight.

#### HONORABLE MENTION

To Illinois Tuberculosis Association: for giving date, number of pages, price, and address of publisher for all books offered as reading references in bulletins sent to schools.

#### HOUSE ORGANS

Of special interest to studious public health workers is the *Quarterly Bulletin*, Milbank Memorial Fund, 40 Wall St., New York. Better ask for a copy to sample its contents before seeking a place on its mailing list. The full-page photographs which "bleed" over the edges are more useful through a new device. An eighth of an inch blank band across the bottom of the page allows for a caption in 6 point type, without making the words obtrusive.

"That Annual Meeting," in *News Letter*, Victorian Order of Nurses For Canada, Ottawa (Jan., 1933), gives a baker's dozen of hints for making the meeting "different" and useful. Here is one idea:

Have a pioneer dinner, an occasion for bringing to the meeting, if possible, persons who shared in the beginnings of the organization and who have since gained distinction elsewhere. For such a dinner a supposed director of the organization in 1950 might talk about the old days of 1932 and the years which followed in a way to bring out the hopes and plans of the organization's future.

*Pittsburgh's Health*, Dept. of Public Health (Nov., 1932), had a "lamb and lion" cartoon on the common cold, and *Health Briefs*, Tennessee Dept. of Public Health (Nov. 15, 1932), reproduced a newspaper cartoon on "False Economy—Closing the Spigot and Opening the Bung!"

Four milk bottles on a door-step appear on the cover of *Bulletin*, State Board of Health, Louisville, Ky. (Oct., 1932). "Milk For Health." Inside several pages are given to "Louisville's Educational Milk Program."

*Birmingham's Health*, in its effective printed form, has been making good use of photographic covers, including an airplane view of the city, a group of laboratory utensils, and a three-dimension bar diagram of the falling death rate.

*The Michigan Nurse*, Lansing, has been re-born in appearance; an effective double-page spread of personality photographs.

New bulletins or house organs are reported for several health departments in California: Kern County, San Bernardino County, Fresno County, Alameda County.

Previously, monthly or bi-monthly

bulletins were issued by San Joaquin, San Luis Obispo, Santa Barbara, Imperial, and Los Angeles counties; and the cities of Los Angeles, San Diego, Sacramento, San Jose, Pasadena, and Oakland.

#### Corrections and Amplifications—

First, as to Jan., 1933, issue: "What Is Health Education?"—It should be spelled "Anette M. Phelan." "Timely Topics"—Price of single copies of *Canadian Public Health Journal* is 35 cents.

Corrections of material in Feb., 1933, issue:

"Honorable Mention"—The New York State Department of Health report lacked a complete index because of the sickness of the capable indexer of the department.

"Reporting" . . . Single copies of the 9-page review of 1932 by Commissioner of Health Shirley W. Wynne, New York City, will be sent on request.

Health Education in Boston—Ruth I. Parsons and C. E. Turner made a study of school and out of school health education during the school year of 1931–1932. The first of a 3-part report appeared in *New England Journal of Medicine*, 8 The Fenway, Boston. Jan. 5, 1933. 25 cents. This first part includes a more detailed review of activities, agency by agency, than ever we have seen heretofore.

The aims of this survey have been threefold:

1. To determine what agencies are carrying on Health Education in the city.
2. To determine the quantity, quality and adequacy of the work which each is doing.
3. To suggest ways of strengthening the present program of Health Education.



## BOOKS AND REPORTS

**Men Against Death**—By *Paul de Kruif*. New York: Harcourt, Brace, 1932. 363 pp. Price, \$3.50.

The author has given us another series of biographical sketches of those who have become famous in conquering disease and in saving life. The book opens with a prologue which is something of an essay on prolongation of life, with various philosophical ideas sketched in. In it many well known biologists and others are mentioned. He takes a dig at periodical medical examinations, though confessing that he bows to the figures of eminent actuaries who show that they prolong life.

Beyond this, the volume is divided into 4 books. The men considered in the first book seem to have been selected more or less at random. There is a reason for classing together the three found in each of the remaining books, which have appropriate titles. With the exception of Semmelweis, Shaudinn and Finsen, who have been dead for years, the author knows personally all those of whom he has written and has gotten most of his material first-hand, though he has studied the literature as well.

The selections seem well made. Those whose histories are given have not only accomplished well worthwhile things, but have dealt with diseases which are widespread and of practical daily interest to all. The book is written in the well known style of the author. He goes into considerable detail, and apparently has the power of discerning the inmost thoughts and motives of those concerning whom he writes. Whether we like this particular style or not, there is no doubt that de Kruif appeals to the public, and his books have caused many laymen to look into the sciences in

which "men against death" have been laboring for so many years, oftentimes at great disadvantage, with little thought except the scientific aspects of the subject, and almost all of them on salaries woefully inadequate, especially when compared to the earnings of those in private practice of medicine, or in many lines of business.

The book is beautifully printed and illustrated, and deserves a wide circulation which we are sure it will have.

MAZÛCK P. RAVENEL

**The Sanitation of Water Supplies**—By *Murray P. Horwood, Ph.D.* Springfield, Ill.: Thomas, 1932. 181 pp. Price, \$3.00.

This volume is intended for students in municipal sanitation and public health. It deals with engineering, laboratory and public health aspects of water supplies. The author traces the development of sanitary water supplies from their beginning to the present time. The same interesting method is used in describing the specific phases of water sanitation. The sources, uses, consumption, and the requirements of a potable supply are discussed. Other chapters deal with the relation of water to disease, the purification and improvement of water supplies, water softening, sand filtration, and disinfection. Adequate examples are given to support statements concerning problems related to the production of potable water. Errors are almost absent. On page 93, however, a reversal of the terms pH 4.0 and pH 8.0 has occurred, which might be confusing to some readers.

The book is extremely well illustrated, and its composition is of the same high type for which the publisher is well known. NEWELL R. ZIEGLER

**Streptococci in Relation to Man in Health and Disease**—By *Anna W. Williams, M.D.* Baltimore: *Williams & Wilkins*, 1932. 260 pp. Price, \$5.00.

An introduction by Park emphasizes the need of a concise presentation of "the important facts and surmises connected with streptococci in health and disease." In the 220 pages comprising the monograph, Dr. Williams has crowded an orderly survey of enormous literature, the results of personal experimentation, and other information regarding streptococci (genus *Streptococcus* according to Bergey) which evokes admiration and promises practical use.

A plan suggestive of bacteriological textbooks is followed, with the early chapters given over to historical sketches, general classification of streptococci, and methods—properly evaluated—of cultivation and identification. Then follows generalized information as to the incidence of these organisms and their rôle in health and in local and general infections of man.

The latter half of the book is made up of chapters dealing with the relationship of streptococci to specific diseases—erysipelas, scarlet fever, septic sore throat, rheumatic conditions, and to various infections in the etiology of which a virus is more or less accepted. Photographs and tables are included, and an extensive bibliography completes the book.

It is essentially a usable book, a compact summary of practical knowledge, and the material is presented in such an easy reading style that it will serve for both immature and mature students. It should stimulate all to further studies.

The statement that the book is published by The Williams & Wilkins Company is sufficient recommendation of the quality of printing and binding.

ANNA DEAN DULANEY

**The Youngest of the Family: His Care and Training**—By *Joseph Garland, M.D.* Cambridge: *Harvard University Press*, 1932. 196 pp. Price, \$2.00.

This is another book on the care and feeding of the infant and young child. It has several merits not found in a number of other manuals on this subject. In the first place the material has been brought up to date and due consideration has been given to the mental hygiene of the child as well as to its immediate physical requirements. The chapter on the Runabout Age, while short, gives a good outline of the measures which may be applied to the preschool child.

The book is written apparently for the more intelligent group of mothers. It is conveniently arranged for reference. The line drawings and half-tone illustrations are excellent.

RICHARD A. BOLT

**Syllabus of Medical History**—By *Victor Robinson, M.D.* New York: *Froben Press, Inc.*, 1933. 110 pp. Price, \$1.00.

According to the definition of the term syllabus, an author presumably has a certain right to selection of topics, but when the selection is poor, one has the right to criticise. This book is said to consist of specimen questions and answers from the author's course, a specimen essay taken from a work of his, and a specimen chronology of goiter. Fifty pages are given to questions and answers, and 16 to the essay, the rest of the book being taken up almost entirely with reproductions of instruments, injuries to bone, etc.

We find that men like Loeffler, Bretonneau, and Lister are mentioned only incidentally, with no description of their accomplishments. The index does not even list diphtheria, typhoid fever, malaria, meningitis, and other important diseases, the study of which

has played a large part in the development of our present knowledge of medicine. All that we are told of anthrax is that Koch wrote a paper on its etiology. Loeffler's accomplishments are limited to the statement that he wrote with Koch on disinfection. Malaria, with its interesting and valuable history, is mentioned only in connection with the treatment of syphilis. Ross, Negri, Laveran, Budd, Gerhard, Banting, and many others who have made really great discoveries, are not even mentioned. The reviewer wonders how such a book ever came into being, and how it came to be published. A real syllabus of medical history would be extremely valuable.

It would be hard, of course, to write 60 pages without including some interesting facts, but there is so little told, even about those mentioned, and there are such flagrant omissions, that one cannot recommend the book for students or teachers, for whom the author says it is designed. Nearly two pages at the beginning of the book are given to some excellent quotations.

MAZYCK P. RAVENEL

#### pH and Its Practical Applications.

*A New Handbook and Reference Work—By Frank L. La Motte, William R. Kenny, and Allen B. Reed. Baltimore: Williams & Wilkins, 1932. 262 pp. Price, \$3.50.*

This little volume is essentially a discursive handbook. The first part describes the determination of pH by means of indicators, while the second part sketches the pH control practice in a number of industries. Chapters, in the latter part, are given to such subjects as water supply, water corrosion problems, disposal of sewage and industrial waste, sugar industry, gelatin and glue, leather, textiles, pulp and paper, food industries, cleaning, metal electro-deposition, soils, and microbiology. In many cases interesting charts are given

showing the pH zones optimal for various steps in the process under consideration.

The first section of the book would seem a bit one-sided, as the entire explicit mention of electrometric methods of pH determination is confined to about one paragraph, even though one such method, the hydrogen electrode potential, is treated as the basic method. The excuse given for such treatment is that "all electrometric methods require considerable experience and skill on the part of the operator." Even if such be the case, which seems questionable to the reviewer, the book would not have been enlarged much, and would seem more balanced, had there been a chapter included outlining the technic and the limitations of potential measurements.

Simplicity of presentation is the avowed aim of the authors and nothing could be desired in this respect. Indeed it may well be that many, lacking adequate technical training yet finding themselves in a position where pH control is essential, will find the book valuable as a practical guide.

ALLEN E. STEARN

*Bacteriology for Nurses—By Mary Elizabeth Morse, A.B., M.D. and Martin Frobisher, Jr., S.B., Sc.D. 4th ed. Philadelphia: Saunders, 1932. 409 pp. Price, \$2.50.*

This is a good book, composed of 30 chapters, 3 appendices and an index. Eleven chapters comprise the first section and are devoted to general bacteriology; the remaining 19 chapters concern special bacteriology and pathogenic protozoa.

The authors say they have practically rewritten the book to bring it up to date. Much new material on immunity, allergy, disinfectants, ultramicroscopic viruses, filterable forms of bacteria, dissociation, yeasts and molds, anaerobes and anaerobic technic, undulant fever,

and tuberculosis has been added, with illustrations. The arrangement has been made to conform with the demands of the standard curriculum.

The bulk of the book is on fundamentals, the appendices on methods. These have been reduced to the minimum to conserve space for the text proper. It is expected that an instructor will demonstrate or teach methods and the student take full notes, thus avoiding the necessity of detailed descriptions in the text. C. F. ADAMS

**Bacteriology for Nurses.** *With a Laboratory Manual*—By Royal M. Calder, M.D. Philadelphia: Saunders, 1932. 285 pp. Price, \$2.00.

A new textbook written distinctly for nurses—"with the *nursing application* of every bit of information strongly emphasized." Bold type is freely used to call attention to various headings, especially where special care and technic is needed.

Part I consists of 12 chapters that deal with the principles and practice of bacteriology and immunology, such as methods of study, infection and resistance, transmission and disinfection, diseases transmitted through discharges of the nose, mouth and gastrointestinal tract, wound infections, prevention of blindness, food poisoning, venereal diseases, insect-borne diseases and higher bacteria, yeasts and molds.

Part II consists of 9 laboratory exercises covering general methods for the study of pathogenic organisms and the bacteriology of water and milk. Following a few useful illustrations of the handling of simple apparatus, these laboratory exercises are furnished with blank lines and circles for notes and drawings.

The appendix consists of 20 pages of miscellaneous material of apt application, some of it concerning general or fundamental matters, and some referring to specific things, all very useful.

C. F. ADAMS

**The Expectant Mother's Handbook**  
—By Frederick C. Irving, M.D.  
Boston: Houghton Mifflin, 1932.  
203 pp. Price, \$1.75.

This compact little handbook from the pen of an experienced obstetrician is well written, full of common sense, and attractively arranged. It explains clearly and without verbosity the anatomical, physiological, and hygienic aspects of pregnancy; touches on some of its dangers and complications; and gives what the patient wants to know about labor and the lying-in period. A rather unusual feature of the book is a chapter on the biological aspects of pregnancy.

This can hardly be said to be a simple enough book for all prospective mothers but the intelligent and well informed woman will find here everything she needs to supplement what she gets from her family physician.

MERRILL E. CHAMPION

**Applied Bacteriology**—By Thurman B. Rice, A.M., M.D. New York: Macmillan, 1932. Price, \$2.50.

The title of this book is misleading, as it is intended for nurses. The author disapproves of all existing texts on bacteriology for nurses on the ground that they are merely medical books "written down."

We regard this volume as excellent for its announced purpose. It contains a large number of illustrations, some good and instructive, and some poor. It is stated that they are "overdrawn" for the purposes of presenting a clear picture. The text is readable, and as far as we have been able to detect, accurate. We approve of the announced object of avoiding theory and stressing points necessary for diagnosis, the collection of specimens, and nursing treatment. As is well known to many of our readers, the author has a distinctly original and practical way of presenting his material, which is carried out in this latest work.

We can recommend it, but believe that nurses should have, in addition to lectures and a good textbook, practical laboratory experience, though the preface does not indicate that this is a text to accompany such practical training. The make-up and printing of the book are excellent. MAZYCK P. RAVENEL

**Publications of the National Quarantine Service, Republic of China**  
—Series I—By Dr. Wu Lien-Teh.

This publication reviews the cholera situation in China, giving a very complete history of this disease in Shanghai, starting from the year 1820, when the modern history of cholera in China is considered to begin, up to and including the year 1929, and more especially portrays the great improvement in the cholera situation since the establishment of the National Quarantine Service on July 1, 1930.

For many years the problem of cholera in Shanghai has been an acute one but coöperation of the three health authorities in Shanghai (International Settlement, French Concession, and Greater Shanghai) was not achieved for the common purpose of combating this disease and improving health conditions in the community.

The establishment of the Ministry of Health in Nanking in 1928 was followed by the adoption of a new progressive policy, and in 1930 there was created a Central Cholera Bureau where the efforts of the three health authorities could be coördinated, all under the general direction of the National Quarantine Service, of which Dr. Wu Lien-Teh is Director. A program of anti-cholera vaccination was mapped out and an intensive epidemiological study of local cholera foci was undertaken, including examinations for carriers, possibility of water infection, etc.

When in the summer of 1930 an outbreak of cholera occurred, the authori-

ties were united and prepared to fight it, with the result that only 128 cases were recorded with 16 deaths. When compared with previous outbreaks of cholera in Shanghai, the 1930 outbreak showed not only a decided reduction in the number of cases and deaths but the onset of the epidemic occurred later than in many of the previous years. From May to September 537,034 anti-cholera vaccinations were performed. There is little doubt but that the strenuous anti-cholera campaign conducted earlier in that year contributed not a little to this satisfactory result. During the outbreak laboratory research was carried on regarding the recognition, viability, agglutination, etc., of the cholera and related organisms, the results of which are summarized.

The publication also includes an extensive report of a survey of the needs for establishment of adequate quarantine service for the port of Shanghai made by Dr. C. L. Park of Melbourne, Australia, Chief of the Epidemiological Division of the Health Section of the League of Nations, and Director of the Australian Quarantine Service.

F. A. CARMELIA

**Medical Care for the American People—The Final Report of the Committee on the Costs of Medical Care. Chicago: University of Chicago Press, 1932. Price, \$1.50.**

This volume is the result of 5 years of work and the expenditure of something like a million dollars contributed by a number of foundations. Assistance in the shape of supplementary studies has been given by a number of scientific organizations, and credit is given to state and local departments of health and other organizations for coöperation in field work. In addition to this final report, some 26 studies have been already published. The committee believes that a number of questions have been raised which need further

attention, and for several of them, outlines of studies have been made.

The report is divided into two chief parts; the majority and minority recommendations. In addition to the principal minority report, there is a second, by two dentists, and the volume is closed by two personal statements by members of the committee, one of which contains much food for thought, and the last, a statement that the recommendations do not deal adequately with the fundamental economical question, to study and consider which, the committee was primarily formed.

The majority report recommends that medical service, both preventive and therapeutic, "should be furnished largely by organized groups of physicians, dentists, nurses, pharmacists, and other associated personnel," and that these should be organized around hospitals. High standards are insisted on. It further recommends "the extension of all basic public health services," so that they will be available to the entire population, according to its needs. This requires greater financial support for health departments and full-time trained health officers and staffs. ". . . The costs of medical care should be placed on the group payment basis through insurance, taxation, or both methods," but medical services on the individual fee basis may be continued for those who prefer it. The committee recommends also that the "study, evaluation, and coördination of medical service be considered important functions for every state and local community," and that "the coördination of rural with urban services should receive special attention." The last recommendation deals chiefly with the training of physicians, dentists, pharmacists, nurses, nurse-midwives, etc.

The principal minority report recommends that "government competition in the practice of medicine be discontinued and that its activities be re-

stricted (a) to the care of the indigent and of those patients with diseases which can be cared for only in governmental institutions; (b) to the promotion of public health; (c) to the support of the medical departments of the Army and Navy, Coast and Geodetic Survey, and other government services which cannot because of their nature or location be served by the general medical profession; and (d) to the care of veterans suffering from bona fide service-connected disabilities and diseases, except in the case of tuberculosis and nervous and mental disease." The minority believes that government care should be extended to indigents in order to relieve the medical profession of the burden it now carries in this respect. It agrees with the majority in believing that "the study, evaluation, coördination of medical service be considered important functions for every state and local community." It recommends that "united attempts be made to restore the general practitioner to the central place in medical practice." It opposes vigorously the "corporate practice of medicine, financed through intermediary agencies," regarding it as being economically wasteful, unfair to the medical profession, and inimical to continued high standards. It believes that methods which can be fitted into present institutions and agencies without interfering with the fundamentals of medical practice be tried, and ends by recommending the development by state or county medical societies of plans for medical care.

From this abstract of the two chief reports, it will be seen that while there is agreement on some points, there is absolute disagreement on important fundamentals.

We recognize the inadequacy of this review, but the report itself is so succinct, and covers so many points, that a detailed review is impossible. The committee has been thorough in its

work and has considered almost every point that might be raised. Everyone recognizes that economic conditions have brought about a change in the relationship between the doctor and the people. Group practice has probably come to stay. Expenses have mounted so that it has been said only two classes of people in America get proper medical care—the poor and the rich.

The American Public Health Association is not primarily interested in the practice of medicine, although it is generally recognized by the members that efficient medical care plays a great part in promoting public health, by the early detection of cases, proper isolation, and the destruction of foci of infection. That it recognizes the difficulties of the present situation is proved by the many studies which have been carried on through grants for some years, but so far, it has not officially committed itself to one or the other of the reports of this committee. Until such a time, we can only commend the report to the careful consideration of those who are interested in adequate medical care and the many problems which are involved in extending it to all. The majority report as well as the several minority ones present questions which may well be considered by every thoughtful individual.

MAZÛCK P. RAVENEL

#### Fads and Quackery in Healing—

By Morris Fishbein, M.D. New York: Covici-Friede, 1932. 384 pp. Price, \$3.50.

The craft of healing always has been a reasonably honorable one. Long before medicine emerged as a science, however, it was invaded by a host of mountebanks and imposters. Today it is infested with quacks and charlatans, with fakirs and faddists, mostly on the fringes of regular medicine, but not entirely so, for it is rumored that not all the shysters and incompetents are outside of the profession.

To this ilk the militant editor of the *Journal of the American Medical Association* and of *Hygeia* pays his respects with much gusto, and exposes to ridicule with his pungent pen the actual or alleged foibles of homeopathy, eclecticism, osteopathy, chiropractic, Christian Science, physical culture, and the various offshoots, imitations, and modifications of these dubious benefactors of mankind.

Other topics dealt with in a vigorous and frequently vitriolic manner are the methods of the late Albert Abrams; the antivivisectionists, the less ethical beauty culturists, and the more deluded of the psychoanalysts. Rejuvenation, birth control, food fads, physical therapy of the coarser sort, medical errors in newspapers, and medical advertising also come in for some scathing comments.

One anomalous chapter is devoted to fads in health legislation. This material, reprinted from a magazine article of some years ago and bolstered with diatribes on the federal maternity and infancy law and the care of veterans, is the weakest part of the book, so weak, in fact, that it totters. A final chapter on the choice of a physician consists mainly of a catalogue of the *Principles of Medical Ethics*. If this chapter had been omitted, not much would have been lost, especially since the highly diverting chapters on the various quacks emphasize clearly enough that abstinence from these forms of healing is wise. The pecuniary emoluments accruing to some of these imposters are, however, so attractively set forth that some readers may be inspired to go into such lucrative business.

This book is entertaining and instructive. It is well printed and deserves wide perusal. The layman could benefit much from the information contained in it, but it is doubtful if even such a persuasive volume as this will have any permanent effect in reducing

medical quackery. The privilege of being duped is one of the indefeasible rights of the American people.

JAMES A. TOBEY

**History of Chinese Medicine—By K. Chimin Wong, Licentiate of Medicine and Surgery, Hongkong, Formerly Lecturer on Medical History, - National Central University, etc., and Wu Lien-Teh, M.A., M.D., Dr.M.Sc., Director and Chief Medical Officer, Manchurian Plague Prevention Service; Director, National Quarantine Service, etc. Tientsin, China: The Tientsin Press, Ltd., 1932. Price, \$7.50.**

This monumental work was conceived of more than 15 years ago, and the actual writing has consumed some 10 years. One can readily understand this even by a glance through its pages.

The volume is divided into 2 books. The first, written by Dr. K. Chimin Wong, covers (1) The Ancient or Legendary Period, 2697–1122 B.C., (2) The Historical or Golden Period, 1121 B.C.–960 A.D., and (3) The Mediaeval or Controversial Period, 961–1800 A.D. The second book, running from 1801 to 1832, which takes up a little more than three-fourths of the volume, was written by Dr. Wu Lien-Teh, whose industry in connection with the Manchurian Plague Prevention Service, the National Quarantine Service, and other notable endeavors is well known.

The authors recognize that in the early period there were countless myths and legends recorded which are of interest chiefly to students of mythology. Later, these stories became more authentic, and the historical period gradually developed, which covered nearly 2000 years, extending over 3 dynasties. Medicine was practically dominated by philosophical teachers. The Han dynasty (B.C. 206–A.D. 220) of this period is memorable because of

the fact that during it, 3 of the greatest physicians produced by China lived, and is considered the most glorious period of Chinese medical history. These men laid stress on direct observation and placed medicine on a more scientific basis. From the 11th to the 17th centuries, there came a marked change in medical thought, which gradually developed into 4 schools. There were constant attacks both on the old and the new. Specialism was noticeable, and many important monographs were produced. The most notable feature of this epoch was the struggle between the old and the new forces, but the latter steadily gained ground. While there was a great deal of mysticism and superstition, many observations were made in anatomy, physiology, and therapeutics. Indeed, it seems that the Chinese discovered, in part at least, the circulation of the blood 2000 years before Harvey. The Nei Ching says: "All the blood is under the control of the heart." "The heart regulates all the blood in the body." "The blood current flows in a continuous circle and never stops." There was no distinction made between the arteries and the veins. The systemic and the pulmonary circulation were not differentiated, and weird functions were attributed to various organs.

During the T'ang dynasty (619–907 A.D.) Buddhism came into China, and with it, ideas of Indian medicine. Also the Taoist became active and a system of charms for the cure of disease was invented. The author of Book One designates the Chou dynasty as the "age of philosophy, the Han dynasty the age of science, the T'ang dynasty the age of superstition."

Book Two gives a short discussion of conditions prior to 1600 A.D., and describes the early contacts between China and western medicine, the influence of Buddhism, and finally the arrival of a foreign medical man in 738 A.D. The



author tells us that there were European physicians on the staff of the Mongol conquerors, describes the activities of the Nestorian Christians, the first Catholic missionaries, and the early Portuguese hospitals at Macao. It was during the reign of Wu Ti (B.C. 140-87) that the Chinese Empire extended its domain westward and brought about the early Euro-Asiatic contacts. This ruler was considered the greatest of the Han sovereigns. Knowledge of this period is due largely to the great historian of the Han dynasty, Szu-ma Ch'ien (B.C. 145-74). The author gives full credit to European medicine and to missionaries, among the first whom were the Roman Catholics (1294 A.D.) and attributes the developments in the 17th and 18th centuries largely to their influence. While they were not trained medical men, they had opportunities to demonstrate the value of western medicine, and introduced quinine. Western medicine was more firmly implanted by the surgeons of the East India Company and the first Protestant medical missionaries about 1820. For 50 years after, there was much effort by individuals, among whom Dr. Wu names Alexander Pearson, Senior Surgeon of the East India Company, who introduced vaccine against smallpox, T. R. Colledge, President of the Chinese Medical Missionary Society, Peter Parker, W. Lockhart, J. C. Hepburn, J. L. Maxwell, and Patrick Manson.

The modern conception of public health, as understood today, had its beginning after the outbreak of pneumonic plague in 1910, which swept Manchuria and cost 60,000 lives. American doctors played an important part during this epidemic.

It may be said that Book Two is largely a history of the missionaries, religious and medical, who have served in China, and the author is generous in the credit and praise he gives to them.

In 1911 came the beginnings of modern public health work under Chinese physicians, who since that time have maintained their leadership, many of them having been educated in Europe and America. A number of women have taken prominent parts in the new developments. There are many other interesting features which we would like to comment upon in some detail, such as the 2 outbreaks of plague in Canton and Hongkong, and Manchuria. In 1912, the Manchurian Plague Prevention Service under the direction of Dr. Wu Lien-Teh was established. A detailed account is given of the foundation of medical schools, described as "proper union medical schools," and the systematic training of nurses. The founding of the China Medical Board and its acquisition of the Union Medical College in Peking in 1915, was a most important step. Coincident with advances came the founding of Chinese medical journals, a list of which is given. Many standard books were translated into Chinese and published.

There are lists of persons, a summary of dynasties, geographical names in Chinese, with their English equivalents, chronological tables, and finally an excellent index. The volume is profusely and well illustrated, while charts, such as Figure I, which illustrate the chief sources of Chinese medicine, are of great help to the foreign reader.

One cannot but speak with the greatest admiration of the thoroughness with which the work has been done and the enormous amount of labor expended. Dr. Wu Lien-Teh believes that a new spirit has arisen in China among all classes which has brought about changes of relationship between the foreigners and the Chinese, so that missionary colleges, hospitals, etc., are ready to adjust themselves to Chinese views and to elect Chinese as presidents and directors, as well as to make many

Chinese appointments. China is ready to discard many of its old ways, to receive and adopt western ideas and new ways of living.

The English used by both authors is excellent, and we only wish that American writers could be as explicit and succinct as these learned foreigners have shown themselves to be. The printing and make-up are excellent. Altogether, the book is most useful and interesting, opening up to us the history of this great Empire, in which civilization flourished long before most of our western countries came into organized existence.

MAZYCK P. RAVENEL

**The Curative Value of Light—By Edgar Mayer, M.D.** *New York: Appleton, 1932. 175 pp. Price, \$1.50.*

In the January 16 number of *The Journal of the American Medical Association*, Dr. Mayer presented an article on the present status of light therapy which has been of great value to students of this form of therapeutics.

With the development of sun lamps, ultra-violet transmitting glasses, and the general urge from the sales viewpoint to greater purchase of these means for producing artificial sunlight, there has arisen in the lay-mind many problems.

Many of these problems are now resolved for the layman in this new book of Dr. Mayer's. In it he tells simply and clearly the things that the layman wants to know about what the elements do, what sort of disease conditions may be prevented by ultra-violet treatment, how much of the body should be exposed during sun bathing, how to use the lamp with children, etc. Answers to all of these questions are to be found in this new and valuable contribution to public health; and not the least of its values is advice as to

how to avoid over-dosage and ill-treatment.

The language is simple and clear and the book full of the things we all wish to know.

W. H. EDDY

**Teaching Nutrition to Boys and Girls—By Mary Swartz Rose.** *New York: Macmillan, 1932. 198 pp. Price, \$2.00.*

That proper diet selection will prevent ill health—is today accepted science. But how to make individuals practice such food selection?

Mrs. Rose, in her *Feeding the Family*, and *Foundations of Nutrition*, has already established her position as a successful organizer of what should be known and done in making food selection an aid to health. But in those books she addressed an adult audience.

In the present book she has evidenced an appreciation that if children can be made to realize what food does for them and to seek voluntarily those foods which produce bodily vigor and happiness, adult problems will be much simplified. It seems to me that her text not only shows realization of the advantages of beginning early with nutritional training, but also shows skill in making children learn by doing. Tests which she described would make the acquisition of essential facts about foods not only painless but enjoyable to the average child.

The form of the material presented also adapts itself readily to any elementary school curriculum, as the test described can be made a part of the child's general science experimentation and does not represent another course of study to be fitted into a crowded curriculum.

It seems to me that the book should be strongly recommended to the attention of all elementary and high school teachers.

W. H. EDDY

# ASSOCIATION NEWS

Sixty-second Annual Meeting of the American Public Health Association, Indianapolis, Ind., October 9-12, 1933,  
Headquarters, Claypool Hotel

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

- Dr. U. B. Bowden, Pelham, Tenn., County Health Officer  
Franklin M. Foote, B.S., 330 Cedar St., New Haven Hospital, New Haven, Conn. (Student) (Assoc.)  
Dr. G. W. Kirk, Shepardsville, Ky., County Health Officer  
W. E. Noblin, New Court House, Jackson, Miss., Director, Hinds County Health Dept.  
Edwin R. Van der Slice, M.D., 530 N. Butler, Lansing, Mich., (after May 1) Health Officer  
Louis Van Hoesen, M.D., Prospect Ave., Hudson, N. Y., Health Commissioner, County of Columbia  
Adolph Weinzirl, M.D., 3600 Harford Rd., Baltimore, Md., Epidemiologist, Health Dept.

### *Laboratory Section*

- Robert M. Pike, Ph.D., Otsego County Laboratory, Cooperstown, N. Y., Bacteriologist

### *Public Health Engineering Section*

- Nathan B. Jacobs, 507 Westinghouse Bldg., Pittsburgh, Pa., Consulting Engineer  
Arthur Taylor, C.E., City Hall, Beverly Hills, Calif., Engr. Beverly Hills Water Dept.

### *Food and Nutrition Section*

- Laura C. Pepper, Dairy Branch, Dept. of Agriculture, Ottawa, Ont., Canada, Lecturer, Milk Utilization Service  
Roger W. Truesdail, Ph.D., 1206 Maple Ave., Los Angeles, Calif., Food and Nutrition Consultant

### *Industrial Hygiene Section*

- Ben H. Grimes, Bessemer, Ala., Box 144, San. Inspector, Tenn. Coal, Iron & R. R. Co.

### *Public Health Education Section*

- Raynor E. Anderson, Financial Center Bldg., Oakland, Calif., Secretary, Public Health Committee, Oakland Chamber of Commerce  
Evangeline Moore Darrow, Dairymen's League Cooperative Assn., 11 W. 42 St., New York, N. Y., Assistant Director, Home and Health Education Departments  
Dr. Luis Gaitan, Callejon Manchén No. 14, Guatemala City, C. A., Subdirector and Secretary of Public Health (Assoc.)  
Gerry R. Holden, M.D., 1022 Park St., Jacksonville, Fla., President, Florida Medical Assn.

### *Public Health Nursing Section*

- Virginia Atkinson, R.N., Van Lear, Ky., Public Health Nurse  
Anne F. Beven, R.N., Battle Lake, Minn., Field Nurse, Ottertail County Sanatorium  
Mary Keith Cauthorne, R.N., State Department of Health, Charleston, W. Va., State Advisory Nurse  
Ruth Fisher, R.N., 105 E. 7th St., Plainfield, N. J., Director, Visiting Nurse Association  
Grace Frauens, R.N., 54 E. 53 Terrace, Kansas City, Mo., Educational Director, Visiting Nurse Association  
Clarissa Gibson, B.A., 4101 Walnut St., Philadelphia, Pa., Supervisor, Public Health Nursing Dept., Babies Hospital  
Viera M. Tuhy, R.N., 663 N. Main St., Wilkes-Barre, Pa., Communicable Disease Nurse, City Health Department

### *Unaffiliated*

- Agnes Gelinas, R.N., Mary McClellan Hospital, Cambridge, N. Y., Instructor of Nursing  
June A. Ramsey, R.N., Harper Hospital, Detroit, Mich., Superintendent of Nurses

# PUBLIC HEALTH ADMINISTRATION

**Commonwealth Fund—Organized** "to do something for the welfare of mankind," the Commonwealth Fund in 1931 aided rural health work in 4 southern counties, where departments were previously unbalanced and inadequate, to establish a level of consistent integrated service which should be stimulating to other communities. The development of traveling field units has spurred county health officers to better planning and increased achievement. In Massachusetts, two groups of towns have been helped to pool their resources in modern health units. Six rural hospitals were given assistance, and 36 clinical institutes have been supported. Forty-five physicians and dentists from small towns were sent to medical centers for postgraduate study, and 32 picked undergraduates in medical schools were given scholarships to prepare for rural practice. Three medical schools serving rural clienteles were enabled to teach preventive medicine more effectively. These are only some of the activities in the public health and medical fields which were aided in a constructive manner.

In its public health program, the Fund tries to strike a balance between sound general principles and the strategy which is dictated by the needs and psychology of a given community. One of the most effective tools for strengthening both plan and performance is the field unit which has been set up in each of the 3 states. This unit, an innovation in rural health organizations, consists of a team of carefully selected workers—a physician trained in public health, a nurse, a sanitarian, and a clerk. Singly and in combination, these workers act as intermediaries between the state health officer and the local health department, bringing the former accurate information and a skilled interpretation of local situations, advising the latter, stimulating better technic in individual tasks, and helping to map the strategy of local service.

## Diphtheria Prevention Programs

—At a luncheon conference at the annual meeting of the American Public Health Association in Washington were presented mimeographed outlines of diphtheria prevention programs of various cities in the United States and Canada. Extracts from these reports may be of interest to public health administrators. In the 1931 campaign in Chicago, the formal drive for immunization began in October with intensive radio publicity of 10 days' duration, in which 54 talks over 9 local stations were given by members of the Board of Health staff, and daily bulletins issued by the board were read by station announcers at various times of the day.

One of the greatest helps that we have had was the announcement from the altars in all Catholic churches that on certain days preventive treatments would be given in the district parochial schools and all mothers with children over 6 months of age were urged to bring them in for these treatments. Arrangements to give these treatments in a particular parochial school were never made until a representative from the Chancery office had conferred with the priest, after which the nurse in that district conferred with the priest and the sister superior concerning the final arrangements. On the Sunday of the announcement, an attractive folder, containing a letter from the Archbishop and another from the president of the Board of Health, was handed out. Just before beginning the treatments in a public or parochial school that district was canvassed by the nurses and every mother invited to bring the preschool children in on the date set.

The prevailing note of this campaign was to protect the preschool child. Very little was said about the school child, though the usual procedure of immunization in the schools was continued. A total of 70,887 preschool children were given two injections of toxoid, 1 week apart, while 47,106 school children between 6 and 10 years of age were given three doses of toxin-antitoxin, 1 week apart.

In Baltimore, a 6-week period prior to the launching of the campaign on May 1, was allowed to elapse, during which time the department made every effort to "skim off the cream" of the diphtheria prevention practice and steer it into the offices of the private practitioner. During this period the department made available to practising physicians specially prepared literature for use in their offices in connection with diphtheria prevention. The time of the beginning of the campaign was thought to be especially appropriate since May 1 each year is nationally and locally proclaimed Child Health Day and is the time at which the parent interest of the city is most likely to be focused upon the health of its children.

The Mayor officially inaugurated the drive by issuing a special May Day proclamation. The Baltimore Association of Commerce gave every assistance to the Health Department in the campaign by supplying the names of industrial plants employing more than 50 persons, and by publishing articles in their monthly journal, and in this way bringing the drive to the attention of the leading business executives of the city. As a result of this, over 150 industrial plants placed approximately 49,000 circulars on diphtheria prevention in pay envelopes. About 74,000 diphtheria circulars were sent to their subscribers by the Chesapeake & Potomac Telephone Company. Over 100,000 pamphlets containing a message to parents about diphtheria were distributed to pupils of elementary schools in whose homes there were infants and children under school age. During Negro Health Week, which began April 3, 18 meetings were held and diphtheria prevention was stressed; 46 talks were given, approximately 18,000 parents reached, and about 15,000 diphtheria prevention pamphlets distributed.

Ministers coöperated by announcing to their congregations the opening of the drive. Motion picture houses of the city carried during the first week in May a special trailer giving a brief message on diphtheria prevention. It is estimated that this trailer was viewed by audiences numbering more than 500,000 individuals. Radio stations of the city assisted by giving short announcements at opportune times during the campaign. The daily newspapers gave generously of their space for editorials and feature stories following the

progress of the drive. In addition, special articles were published in the *Catholic Review*, *Jewish Times*, *Magazine of the Women's Civic League*, *Baltimore Association of Commerce Journal*, *Boy Scout Magazine*, and *Baltimore Health News*.

An impetus of inestimable value to the campaign was given by the Baltimore Department of Education and the Maryland Congress of Parent-Teachers. With the adoption of the Children's Charter of the White House Conference on Child Health and Protection as its program for the guidance of its activities for the present year, the Maryland Congress of Parent-Teachers has taken an active part in diphtheria prevention in the preschool age group. Health officers from the staff of the Baltimore Health Department spoke on the subject of diphtheria prevention at many of the Parent-Teachers meetings during the first part of the year. Their 15-minute talks were followed by a 5-minute talk by a parent who presented the plan of coöperation of the Maryland Congress with the Health Department.

In Vancouver, Wash., circulars are sent to the families of all school and preschool children. Personal contacts are made by members of the Parent-Teacher Associations. Toxoid is used for children up to 12 years of age, and toxin-antitoxin for older children. Some 12,899 children have been treated and it is estimated that about 85 per cent of preschool and school children are immunized.

... The year the immunization was started, there were 33 cases and 5 deaths from diphtheria. For the past 2 years there have been no cases and no deaths.

Milwaukee reported that in 1931 there were 13,038 immunizations conducted in schools and 11,284 in special clinics for preschool children with the coöperation of the county medical society, the Parent-Teacher Associations, and the American Legion Auxiliaries. Middletown, N. Y., reported that 90 per cent of children under 5 years and 96 per cent of those between 5 and 14 years have received immunization treatments. The system includes a definite follow-up in the homes of all infants

and preschool children by the public health nurse.

The success of control of diphtheria in Lethbridge, Alberta, Canada, is believed due to "the lack of any coercion and the cordial coöperation of all concerned." In 1922, with a population of 11,000, there were 87 cases of diphtheria, with 5 deaths. The last case of diphtheria was in 1929 in a family none of whom had been immunized.

In Hamilton, Ontario,

. . . We sell diphtheria immunization to our citizens in the same manner that commercial concerns sell goods. Our nurses and inspectors call and persuade. All baby clinics are centers for the immunization of preschool children; the schools for both school and preschool children.

In 1920, there were 596 cases, with 44 deaths; in 1931, there were 5 cases, with no deaths; and in 1932, no cases.

New Jersey—The district health officer plan is proving its worth on a state-wide basis in New Jersey according to the annual report of the State Department of Health for the year ending June 30, 1932. Such a plan has been carried out for a decade in Monmouth County and in a group of South Jersey counties. There are now 5 district health officers in the state. New Jersey was admitted to the original morbidity reporting area of the United States, having shown by its official records that the required standard of completeness had been reached. This area was developed under the auspices of the U. S. Public Health Service for the diseases of diphtheria, measles, scarlet fever, typhoid fever, and whooping cough. The plan is somewhat comparable to the registration area for births and deaths.

Courses in public health administration offered jointly by Rutgers College and the State Department of Health were attended by 37 students during the summer. Among them were 2 health officers, a physician, 15 sanitary

inspectors, 5 public health nurses, and 7 other officials. Eighteen members of an advanced class finished the two-summer course and received the certificate in public health from Rutgers. There have been 58 students who have finished the course since it was established in 1926.

New Zealand—One of the outstanding features of the year 1931–1932 was the establishment of a new low infant mortality record of 32 deaths per 1,000 live births. The first-month mortality appears to be falling here to a lower level, the rate in 1931 being 22.7 as compared with 25.8 in 1927. It is also gratifying to note a steady reduction in deaths due to puerperal fever from 56 in 1927 to 18 in 1931.

In addition to the public medical and surgical hospitals, which also admit to the general wards a few emergency maternity cases, cases of puerperal sepsis, and obstetrical cases requiring surgical intervention, there are 7 state-controlled maternity hospitals providing 121 beds, 75 public maternity hospitals or maternity annexes attached to public hospitals providing 508 beds, 282 private hospitals providing 852 maternity and 1,333 medical and surgical beds. Seventy-three of the maternity hospitals also admit a limited number of medical and surgical cases under strict regulations excluding or restricting the admission of septic surgical cases.

The outstanding need in regard to all public maternity hospitals is more extensive, more systematic, and a higher quality of antenatal care, particularly with regard to closer supervision by well qualified obstetricians.

Here, as in other localities, there is observed a rise in the death rate from septic abortion.

There can be no doubt that the majority of these cases are due to the practice of criminal abortion, the incentives to the practice of which are mainly social and economic. The economic factor is emphasized by the marked

rise in the number of deaths occurring since the year 1928. [Twenty-six out of 29 cases in 1931 occurred in married women.] The means of decreasing this dangerous method of limiting families can best be dealt with by societies concerned with the welfare of women. If the enormous risk to life caused by criminal abortion was appreciated by those concerned, it might cause some women at least to abandon that method of meeting a difficult situation.

**School Health Service**—The medical officer of health of Hamilton, Ontario, Dr. James Roberts, recently prepared a report on the amalgamation of health services which faces frankly many questions frequently raised and is worthy of study by health administrators. Extracts from this report follow.

In looking back over recent years of my experience as Medical Officer of Health, I find the discussion as to whether medical inspection of schools should be under the supervision of the Board of Health or Board of Education to have been of annual, nay, even of perennial interest. At times reasonable and dispassionate, the argument has occasionally waxed warm and even acrimonious.

Permit me at the outset of my remarks to call your attention to a fundamental consideration which has not been sufficiently emphasized in the presentation of our problem to those who are not nurses and doctors, but which is of paramount significance to a proper conception of what school hygiene, looked at from a broad and really worth while viewpoint, comprehends. We refer to the difference between "health supervision" and "instruction in health." The former, for the infant, preschool child, school child, adolescent, and adult is preëminently the duty of the official health department. The latter is the function of the educational authority. To except the school child arbitrarily from any comprehensive program of the Department of Health can be defended on no grounds nor by any process of sound reasoning. Health instruction is the business of the Board of Education. Health supervision and protection is the responsibility of the Board of Health and the Medical Officer of Health. . . .

Both academically and strategically the teacher is better equipped to carry on the teaching of health and hygiene in the school-room than the nurse. . . . Not only would I insist on the school authorities seeing that the teacher's training is adequate to insure that this type of instruction shall not be car-

ried out in a perfunctory or half-hearted manner, but that in all the educational curricula of the country the teaching of health and hygiene shall be so incorporated as to invest them with the importance which their influence on the future of our citizenship demands. . . .

Corrective physical education has become as indubitably and acceptedly a part of the school program as manual training, vocational guidance or domestic science or any other of the so-called fads which once upon a time aroused alike the criticism and the deprecation of the taxpayers. Corrective gymnastics, postural exercises, orthopedics, rest, nutritional clinics, sun baths, open air schools, etc., have become indispensable adjuncts in our efforts to insure the ability of the child to attend school and to make the most of his educational opportunities. In the evolution or reorganization of existing school health services, whether under the Medical Officer of Health or School Medical Officer as the case may be, these services are essentially medical as to their establishment and successful maintenance. . . .

The Medical Officer of Health takes the stand, logical and convincing to himself, no matter how irrational it may seem to others, that the necessary visits to the school in connection with the control of communicable diseases offer exceptional opportunities at the same time for search and investigation into the causes which later in life lay the foundation for physical and mental ill health, and that inasmuch as the schools have the children under observation for only 5 to 6 hours per day and for only 195 of the 365 days in the year, any program of health supervision undertaken by the school authorities must of necessity be partial, isolated and in most cases ill coördinated with the scheme of preventive medicine which is in operation throughout every day in the year, and which, moreover, is often responsible for some of the best and most intensive efforts of the Health Department during those months of the year when the school health service, no matter how urgent the necessity, has entirely ceased to function. It is obvious, therefore, and to every one, that where health work, even to the extent of overlapping the work of the Health Officer in the control of contagion is carried on, that official becomes legally responsible for any miscarriage or neglect of duty and must not only carry on a campaign against infections in the public schools but as is the case in this city at the present time, must organize and carry on a similar crusade in the private and parochial schools. . . .

We are, in fact, at the present time, and have been for some years past, in the anomalous position of providing a dental service for

both public and parochial schools, a nursing service for the control of communicable diseases in both classes of schools and a service for the correction of physical defects in the home, or, in other words are carrying on a generalized nursing service covering the entire area of the city. . . .

Just here it would seem opportune to say a few words setting forth the advantages of such a nursing service. Accompanying my report is submitted a map showing the nursing districts which after due regard to density of population and other details necessary to be considered would, in our judgment, be adequate to insure the successful working out of the proposed amalgamation. These districts are so arranged that the district nurse in each case may take care of all children, school and preschool in her area, not only with respect to her work in the schools, but will be able to assume responsibility for attendance at clinics and to follow up work in the homes. Contacts from contagious diseases and absentees from schools on account of presumptive contagion or other disabling causes can be visited without overlapping, as the district over which any particular nurse assumes health supervision contains all that portion of the city from which the attendance at school or schools is derived. . . .

That a system of generalized nursing is the ideal in the field of public health is the opinion of those who have made a comparison of both specialized and generalized systems and who are qualified to make a pronouncement. . . .

It cannot but appear self-evident to anyone who has made a study of our health administration as its outlook has expanded and its development has progressed by leaps and bounds during recent years, that we are not dealing here with merely an educational reform or a social problem, but with a world wide realization of the importance of preventive medicine in the conservation of life and health. For this reason it would seem patent for the Health Officer to undertake whatever measures are reasonably available to promote the health of the entire community at all times and for those of any age. He cannot without laying himself open to the charge of inconsistency assume responsibility for the health of children up to 5 years of age, then turn them over to another official until they are 16, and subsequently without adequate records in his possession concerning the events in their physical and mental career at school, be expected to take the necessary steps to insure for them a healthy manhood and womanhood. . . .

We all, whether health or school officials, doctors, nurses, or lay persons, take a con-

scious pride in the great child hygiene movement, the impulse of which has travelled round the world and the influence of which has been felt to a greater or less degree in every city, town, and hamlet to which the gospel of hygiene and sanitation has penetrated. We all fully realize that as never before in history the present is the era of the child, and that medical inspection of schools, no matter by what authority carried on, has made an outstanding contribution to the betterment of the status of our children. In the future, as in the past, no matter what may be the decision of the city's representatives on the proposed amalgamation, our desire will be to coöperate to the best of our ability with School Boards or other agencies engaged in health and social work, to the end that we may forget our personal differences and consider only the child. Only by the assumption of such an attitude can our efforts be successful and the children be assured of a square deal.

Middletown, Ohio — *The Story Without Words* is the title of the 1932 health department report of this city of 30,000 population. The general death rate was 8.3; the infant mortality rate 48. There were no deaths from diphtheria. Births and deaths are tabulated by wards, and rates are calculated for the city for each of the past 10 years. Cancer deaths are tabulated by organ or part affected. Nurses' visits numbered 12,844. By careful tabular arrangement, an enormous amount of pertinent information is given in this 2-page report.

Lincoln, Neb.—In the 1932 report of the health department, reference is made to the advantages of the housing of the department in the new municipal building, one-sixth of the space being given to that department. A new laboratory was equipped and saved the city \$1,200 per year on bacteria counts. A newly established diagnostic X-ray equipment is saving the city \$2,400 per year. A skin clinic and an arthritis clinic are proving useful. A council of health agencies has been formed with 14 participating agencies.



# LABORATORY

## PROPOSED CHANGES IN THE NEW (SIXTH) EDITION OF THE STANDARD METHODS OF MILK ANALYSIS

ROBERT S. BREED, PH.D., F.A.P.H.A.  
*New York Agricultural Experiment Station, Geneva, N. Y.*

AT the Washington meeting of the Laboratory Section Dr. E. M. Bailey, Referee for the Chemical Section of this Report and Dr. R. S. Breed, Referee for the Bacteriological Section, presented manuscripts for the new edition of the *Standard Methods of Milk Analysis* to the Committee on Standard Methods. These were accepted by the committee for presentation to the Laboratory Section. Publication will be delayed for one year in order to permit study and criticism of the report by members of the Section and of other interested associations.

The Chemical Section of the Report, as in previous editions, represents the work of the Association of Official Agricultural Chemists, an association which coöperates with the American Public Health Association in issuing the *Standard Methods of Milk Analysis* report.

The chemical methods for the analysis of milk have been revised to conform to the latest revision of the official methods of the collaborating association. The scope of the section has been enlarged by the addition of methods for testing cream and ice cream. Methods for the determination of available chlorine in preparations used for sterilizing milk equipment and utensils have also been included. The list of selected references has been revised and enlarged.

There are various modifications of

the Babcock method being used at the present time for the determination of fat in ice cream. Some of these procedures have been studied by the Association of Official Agricultural Chemists but as yet no method of this type has been adopted by that body. This question is being further studied by the association named and if a satisfactory procedure is found and adopted by them it will be included in a later report.

The most important changes in the Bacteriological Section consist in dropping all reference to the Frost Little Plate technic and the Stewart-Slack procedure, both of which appear in the present edition as tentative or optional procedures. The description of these two methods has been omitted because of the fact that they have not found extensive use in official routine milk control work and because of a desire to bring about a greater uniformity in the procedures used.

Five new sections of this report have been drawn up to cover procedures already being followed in many milk control laboratories. These are presented as tentative methods and will be placed in an appendix to the main report.

The first of these sections deals with the detection of organisms of the *Escherichia-Acrobacter* group. The two media that are recommended are brilliant green lactose bile (2 per cent),

and Endo agar plates. Chief emphasis is placed on the use of this test on fresh (less than four hours old) or very high quality (less than 10,000 count) raw milk, as a means of determining the efficiency of pasteurization and as a means of detecting recontamination after pasteurization.

Tests for determining the sterility of milk bottles, cans, and other dairy utensils and tests for detecting the presence of thermophilic, psychophilic and saccharophilic bacteria are included. Throughout the report the position is maintained that the methods used should be sufficiently complete to detect the presence of bacteria that may not grow readily on standard agar plates incubated at 37° C. in the belief that high quality milk should not contain large numbers of living or dead bacteria of any type. In view of the importance of recognizing the difference between streptococci capable of producing septic sore throat epidemics and ordinary mastitis streptococci, a section is to be included giving the technic for determining the difference between these two groups of streptococci. At the request of the International Dairy and Milk Inspectors' Association, the Standard Methods Committee has also asked that a section be prepared dealing with

the technic to be used in determining the number of bacteria present in ice cream. Dr. F. W. Fabian has been appointed an Associate Referee to prepare this section of the report.

The sections discussing the standard agar plate technic, the microscopic method of counting bacteria, the methylene blue reduction technic and the sediment test have been completely rewritten and the material organized in a form similar to that used in the *Standard Methods of Water and Sewage Analysis*. The composition and reaction of the standard agar used for water, sewage and milk work has been made exactly the same in the two reports. All reference to beef infusion agar has been dropped out of the milk report. It is required that laboratories carry out certain verification procedures wherever punitive actions are to be based on the result of routine analysis. The cut showing standard sediment discs has been discontinued and it is recommended that laboratories purchase the photographic standards prepared by the Connecticut State Department of Health. About 50 copies of the preliminary manuscript of the bacteriological section of the milk report have been distributed to laboratories throughout the United States and Canada for their study and criticism.

## VITAL STATISTICS

**Health Conditions in New York State, 1932**—Notwithstanding the continued economic depression, unprecedented in scope and intensity, the health of the people of the State of New York during the year 1932 has, in general, been most favorable.

The birth rate has dropped to a new low figure, 15.0 per 1,000 population, and the total number of births, less by 10,000 than in the previous year, has never been lower since the registration became practically complete. The gen-

eral death rate in the state, 11.3 per 1,000 population, was the lowest ever recorded. To realize the degree of improvement represented by such a low rate one need but recall that at the beginning of the century the annual number of deaths was 18 in 1,000. Had this rate prevailed last year, there would have been 90,000 more deaths than the number which actually occurred.

A new low rate was also recorded for the mortality of infants under 1 year of age. Out of every 1,000 babies born

alive, 53 died during the first year of life—less than half of the corresponding rate 20 years ago. Among the important diseases of children, new minimum points were reached by mortality from diphtheria, 2.1 per 100,000 population; whooping cough, 2.3; and diarrhea and enteritis, under 2 years, 6.4. The death rate from measles, 1.6, was lower only twice in the past. On the other hand, due to the greater prevalence of scarlet fever, the mortality from this cause, 2.8, has not been higher since 1922.

With the outstanding exceptions of suicide, with a rate of 20.2, and diabetes, 29.8, both the highest on record, and the continued high mortality from heart disease, 293.3, and the puerperal causes, 58.2 (per 10,000 total births), the death rates from most of the other important causes have either changed but slightly or dropped to new low levels. The downward trend of mortality from tuberculosis continued uninterrupted, the 1932 rate, 61.1, being the lowest ever known in the state. The pneumonia rate also established a new minimum of 96.6. For the first time in a quarter of a century there was a drop in the cancer death rate and although the reduction was only slight, any break in the rising mortality from this cause should be noted. The homicide rate, though still high (5.7), was somewhat below that in 1931 and the mortality from alcoholism, 5.7, was the lowest in 10 years.

Among the other favorable facts, attention should be called to the rate of fatal automobile accidents, 22.0, the lowest in 4 years, and that of other types of accidents, 47.0, which has never been lower. These figures reflect not only the effect of safety measures, but also of the decrease in the number of automobiles on the highways and machines in operation in factories.

Compared with 1931, cases of sickness from reportable diseases increased

by 15,000. More cases of scarlet fever were reported than ever before, the total of 40,000 being greater by 50 per cent than the corresponding figure in 1931. Cases of measles increased by 6,000, whooping cough, by 1,500. The number of reported cases of syphilis, almost 60,000, was by far the greatest on record, representing a rise of more than 100 per cent since 1925. Among the favorable events was the drop in cases of poliomyelitis, the total for the year, 333, being a gratifying contrast to the 6,000 or more cases registered during the epidemic of 1931. A new minimum point was reached by diphtheria, with 4,200 cases in the entire state as compared with 11,000 only 4 years ago.—*New York State Weekly Health News*, 10:25-26 (Feb. 13), 1933.

**Birth and Death Experience in Illinois, 1932**—Complete provisional statistics for 1932 give Illinois the lowest birth and death rates on record in the state. There were 83,183 deaths and 111,523 births reported, giving rates per 1,000 estimated population of 10.7 and 14.4, respectively. Previously the lowest corresponding rates were 10.9, the death rate in 1930, and 15.4, the birth rate in 1931. The number of births in 1932 was 7,265 short of the 1931 figure and 29,914 below the 1924 record, the year of highest birth registration. Since 1924 the number of births in Illinois has steadily declined, the downward trend being much more pronounced since 1929.

New all-time low death rates were recorded for measles with a rate of 0.7 per 100,000; diphtheria, 3.1; tuberculosis, 55.0; diarrhea and enteritis (under 2 years), 7.0; and infant mortality, with a rate of 52.0 per 1,000 live births reported. The death rate from typhoid fever, 1.6, was about on a par with the previous low, 1.5.

New all-time high death rates were established for heart disease with 235.0

deaths per 100,000 population against a previous high of 221.5; cancer, 116.0 against 112.6; diabetes, 26.7 against 25.7.

Automobile accidents resulted in 2,104 deaths, giving a rate of 27.1 per 100,000 as compared with 2,333 deaths and a rate of 28.7 in 1931.—*Birth and Death Experience in Illinois, 1932.*

**Preliminary Report on Marriage and Divorce for Rhode Island, 1932**—The Bureau of the Census announces that, according to the preliminary returns received, there were 4,080 marriages performed in Rhode Island during the year 1932, as compared with 4,635 in 1931, representing a decrease of 555 or 12 per cent. In 1922, there were 5,669 marriages performed.

During the year 1932 there were 730 divorces granted in the state, as compared with 674 in 1931, representing an increase of 56 or 8.3 per cent. In 1922, there were 819 divorces granted.

The estimated population of the State of Rhode Island on July 1, 1932, was 698,000, and on July 1, 1931, 694,000. On the basis of these estimates, the number of marriages per 1,000 of the population was 5.8 in 1932, as against 6.7 in 1931; and the number of divorces per 1,000 of the population was 1.05 in 1932, as against 0.97 in 1931.—*Preliminary Report on Marriage and Divorce for Rhode Island, Dept. of Commerce, Bureau of the Census, 1932.*

**Diphtheria Prevalence and Control in the Countries of Southern Europe**—Spain with a diphtheria death rate of 4.2 per 100,000 population in 1931 has experienced a steady decline in mortality from this cause since 1921 when it had a record of 14.2 deaths per 100,000. Madrid, the capital of Spain, has shown an average mortality rate of 4.4 for the years 1927 to 1931. Preventive immunization has

apparently brought forth successful results. This constructive record is in contrast to the experience of most other countries in Southern Europe.

Portugal, especially, showed a sharp increase in the mortality from diphtheria during the years 1930 and 1931 with 950 deaths in each of these years in comparison with 360 deaths in 1928. In 1930, the 2,141 cases resulted in a mortality of 45 per cent, whereas in 1928 about 16 per cent of the 2,290 cases ended fatally. This sharp rise in case fatality is evidence of the increased severity in the type of diphtheria which has been prevalent in the more recent years in Portugal. Lisbon, the largest city in Portugal, showed an average diphtheria death rate of 10.7 per 100,000 population during the years 1929 to 1931.

Greece, which has had a comparatively low death rate from diphtheria, has nevertheless experienced a steady increase in both incidence and mortality from this cause since 1924 when its low record of 192 cases and 38 deaths was reported. The year 1931 showed a record of 1,447 cases and 146 deaths, 7 times as many cases and 4 times as many deaths as were registered in the banner year 1924. The death rate from diphtheria which was 0.8 deaths per 100,000 population as late as 1928, rose to 2.3 per 100,000 in 1931. Athens, where there has been a recent rise in diphtheria prevalence, has had a doubled mortality in 1930 in comparison with 1929. Immunization has not been adopted on a large scale in Greece, but with greater confidence in its efficacy the demand for it is becoming greater.

Italy, with a continuous rise in diphtheria prevalence since 1926, registered a total of 2,968 cases (0.7 per 1,000 population) in 1930, or nearly double the notifications in 1926. In 1931, however, the number of cases declined to 24,215 (0.6 per 1,000).

Mortality records for Italy show an average rate of 7.3 deaths per 100,000 for the years 1923 to 1928. Rome, which had a diphtheria mortality of 13.6 deaths per 100,000, in 1927, has shown some reduction. The encouraging feature in diphtheria control in Italy is that the Ministry of the Interior, alarmed by the continued increase in the prevalence of this disease, has advocated immunization among all children in the primary schools.—*Bull. Hyg.*, 7:748-749 (Dec.), 1932.

**Connecticut Motor Vehicle Statistics for 1932**—There was a downward trend in all totals of motor vehicle statistics in 1932. The year was marked by decreases in accidents, fatalities, injuries, registration of vehicles, licenses and mileage operated on the state's highways.

Connecticut was enabled, because of some of these decreases, to achieve an enviable position in regard to the accident situation. The accident total was reduced for the fourth successive year and the injury and property damage totals for the third year, while there was at the same time a 16.6 per cent reduction in the fatality total for 1 year. The reductions are not so indicative of careful driving as the totals seem to show, however. Because of the decrease in all accidents and reduced mileage, the ratio of loss or cost per accident is actually higher in some instances, than in the previous year.

Decreases during the year included: accidents, 16.2 per cent; fatalities, 16.6 per cent; injuries, 4.9 per cent; registrations, 3.5 per cent; operators licensed, 1.2 per cent; gasoline sales, 0.9 per cent; property damage, 21.1 per cent. December was the month of most accidents during 1932. In the previous year October led in the number of accidents. The hour from 5 to 6 p.m., as in other years, was the time of most accidents in most days of the

year. There were fewer accidents in 1932 in which more than 1 person was killed, the total being 23 as compared to 37 in 1931.

The increased safety education being provided for children in the schools and elsewhere is proving its worth. Children are better trained than ever before, and on the whole, are better in traffic performance than adults. The decrease in the number of children killed was 25.4 per cent as compared to 15.1 per cent for adults. The number of children injured decreased 12.8 per cent, while the decrease for adults was 2.9 per cent.

The problem of the out-of-state driver in Connecticut accidents appears to be greater than ever before. Last year more than 15 per cent of all cars in accidents were owned and operated by residents of other states. This was an increase of 3 per cent. During the year Connecticut owned and operated cars in accidents were 18 per cent fewer while out-of-state cars in accidents were only 11 per cent fewer than in the previous year. More than one-fourth, 27 per cent of the operators involved in fatal accidents in Connecticut, were from other states.

Intoxication was a contributing factor in 291 serious accidents. The drunken operator was not the only person to contribute to this situation. Intoxicated pedestrians caused 87 accidents and these pedestrians were the greatest sufferers, as all of them not killed were seriously injured. Fifteen were killed, while deaths among intoxicated operators numbered 14.

There was an accident in every town in the state during the year, a rather unusual situation as in past years one or more towns have been free of accidents. There were 3 towns with only 1 accident. Fifty-six towns had no fatal accidents, an increase of 3 from the previous year.—Connecticut State Dept. of Motor Vehicles. *Bull.* 91, pp. 1-2.

# PUBLIC HEALTH ENGINEERING

Dewatering and Incineration of Sewage Sludge Under Test at Chicago—Experiments in the treatment of sludge at Chicago with a view to eliminating digestion and sand drying beds are described. Dewatering sludge by means of a high speed centrifuge (4,000–5,000 r.p.m.) dealing with 100 gal. per min. showed a reduction of suspended matter in the effluent to 500 p.p.m. Vacuum filtration and incineration for disposal of a sludge are being investigated, ferric chloride (5 per cent) being used as a conditioner. A cake with 80 per cent moisture has been produced at a rate of 3 lb. per sq. ft. per hour. The sludge burns fairly well with little odor.

A plant handling 20 tons of solids daily comprises vacuum filter, rotary heated dryer and combustion furnace, the gases from combustion being passed through the dryer. Three hundred and fifty lb. of coal are added per ton of dry sludge. The residue is inert, contains less than 1 per cent organic matter and is free from odor. Reducing the moisture content to about 20 per cent in the dryer appears advisable. The problem of odors during incineration will probably be negligible if the temperature is high (over 1,000° F.); at temperatures of 300–500° F. odor nuisance occurs. *Anon. Eng. News-Rec.*, 109:77, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 2:62 (Feb.), 1933.

High-Lights of Sewage Treatment in Europe—Impressions of sewage treatment in England, Holland, and Germany. In the author's opinion the progress in the utilization of sludge gas for power development as well as for heating digestion tanks is one of

the most impressive steps in sewage plant practice in England and Germany. The installation of gas engines at Birmingham and the sewage works at Motherwell, Scotland, are dealt with.

Reference is also made to the experimental activated sludge plant at Barking, aeration of sewage prior to filtration at Birmingham and the installation of two Dorr detritors with special grit removal arrangements at Wolverhampton. The Knocke-Zoute plant is briefly described; here the summer sewage is treated by settling, aeration, resettling and filtration, and the last process is omitted in the case of the smaller volume of winter sewage; a revolving brush aerator is employed and the plant operator uses the effluent for drinking water.

In Holland the treatment of trade wastes has received considerable attention; at Beverwijk a small activated sludge plant treats normally 7,000 gal. of slaughterhouse waste per day. In Germany as in America the trend is toward the complete use of mechanical equipment. The Stahnsdorf activated sludge plant at Berlin is described. The methods of utilization of sludge gas at Iserlohn, Essen-Rellinghausen, Stahnsdorf, and Wassmannsdorf are described. Users of sludge gas in Germany are compelled to odorize the gas with mercaptans. The German practice of running plants entirely on power developed from sludge gas should not be difficult to adopt in America where the gas production is much greater (0.70–1.30 compared with 0.26–0.56 cu. ft. per head per day). At Neumunster, Schleswig-Holstein, tannery wastes (1 m.g.d.) and sewage (average 4.25 m.g.d.) are treated by screening the flows separately, then allowing the

united wastes to settle for  $1\frac{1}{2}$ –3 hours.

It is becoming realized that the so-called differences between American and European sewages are not so great as was formerly supposed, and that the same treatment methods, suitably modified, may be employed for both. Photographs and diagrams are included. E. B. Besselièvre, *Water Works & Sewerage*, 79:157 and 217, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 2:61 (Feb.), 1933.

**New Water Works for a South American City**—The occurrence of typhoid fever and dysentery in Cali, Colombia, after the introduction of the public water supply, which was obtained from the Cali River, conveyed in an open, unlined canal to an uncovered reservoir and distributed through cast-iron pipes, revealed the necessity of purifying the water. Investigations of the drainage area of the Cali River showed that the river water was liable to pollution from sewage and roads and that conditions were not favorable for effective self purification.

A plant was constructed with an initial capacity of 8 m.g.d. based on a daily consumption of 66 gal. per capita and so designed that the capacity can be increased to 16 m.g.d. This plant, details and photographs of which are given, includes weir chamber, two alum feed machines, apparatus for applying soda-ash or lime to the raw or the filtered water or both, three mixing chambers arranged in parallel, two baffled settling basins, eight rapid sand filters, chlorinators, riffle type aerator, combined clear-water basin and distribution reservoir, pumping station and wash water tank. G. C. Bunker, *Am. City*, 46, 5:75, 1932. From *Summary Current Lit.*, Water Poll. Res., VI, 1:5 (Jan.), 1933.

**A Decade of Municipal Work and Improvement in Gibraltar**—The

original public water supply of Gibraltar, with a population of about 20,000, was obtained mainly from a  $1\frac{1}{2}$  mil. gal. reservoir allowing only about  $\frac{1}{2}$  gal. per head per day during the summer, and was supplemented by a distilling plant producing 10,000 gal. per day and by private underground rain-water tanks, containing an estimated total of 7 mil. gal. and a few small wells. Since 1895 conditions have been improved by the construction of rock catchment areas of  $3\frac{1}{2}$ ,  $11\frac{1}{2}$ , and 23 acres in extent, which yield about 600,000 gal. per in. of rainfall, the average annual rainfall being 33 in. Four reservoirs with a total capacity of 5 mil. gal. and another with a capacity of 2 mil. gal. have also been constructed. A brackish water supply from wells is also laid on to each house. W. H. Pearce, *Surveyor*, 81:625, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 1:4 (Jan.), 1933.

**Link-Belt Aerator-Mixer** — The new Link-Belt elevated diffuser aerator-mixer, a photograph of which is given, utilizes air for agitation and can be used for the aeration tank in activated sludge plants and as a mixer in water purification. The elevated diffusers are located at one side of the tank which should be rectangular and have a maximum width of 16 ft., a maximum depth of 12 ft., and a detention period of approximately  $\frac{1}{4}$  hr. Approximately 50 cu. ft. of air per min. per mil. gal. are required. The power consumption is about 0.05 kw. The velocity is regulated by valves which control the flow of air to the different tubes. Loss of head is negligible and there are no dead spaces in the mixing chambers. Alum and lime may be introduced at different parts of the mixer. R. B. Kern, *Canad. Engr.*, 62, 25:23, 1932. From *Water Pollution Res.*, *Summary of Current Lit.*, VI, 2:7 (Jan.), 1933.

## MILK CONTROL SCHOOLS

W. SCOTT JOHNSON

*Chief Public Health Engineer, State Board of Health of Missouri  
Jefferson City, Mo.*

SINCE the State Board of Health of Missouri adopted the Standard Milk Ordinance Program of the U. S. Public Health Service in 1925, the importance of its educational features have been increasingly evident. The value of this phase of the program was a factor in developing, in 1932, what are believed to be effective adjuncts to the previous plan of procedure.

First, in conjunction with the regular annual rating by the State Board of Health, arrangements were made to hold sanitation schools for dairymen in 8 Standard Milk Ordinance cities. In most cases, 3 or more sessions were held in each city. At these meetings, the requirements of the Standard Milk Ordinance and satisfactory compliance were thoroughly covered, and, with the aid of modern equipment, sanitary methods of milk handling on the dairy were demonstrated in detail. One meeting of the series, which the general public was urged to attend, was largely devoted to discussing the public health aspect of a community's milk supply. Advantage was taken of this opportunity to stress in each city the weaknesses of its particular milk sanitation program. A total of 1,048 dairymen

and interested citizens attended the 28 sessions of the 8 schools.

Second, in coöperation with the Department of Dairy Husbandry of the College of Agriculture of the University of Missouri, the State Board of Health held a 3-day milk control school for city dairy inspectors and plant control men. The essential points of milk sanitation and control were covered by means of lectures, laboratory exercises and field inspections which stressed particularly the requirements of the Standard Milk Ordinance. Dr. M. P. Ravenel, Professor of Medical Bacteriology at Missouri University, and Mr. M. M. Miller, Associate Milk Specialist of the U. S. Public Health Service, ably assisted as instructors the personnel of the Department of Dairy Husbandry, the State Board of Health, and several city health departments.

During the Milk Control School, the city milk inspectors perfected the organization of the Missouri Association of Milk Sanitarians and passed a resolution to continue the Milk Control School on a yearly basis. The total enrollment of the school was 41, and the milk enforcement personnel of 16 cities was represented.

**New Water Treatment Plant.**  
**Installation at Baddesley Collieries**  
—An illustrated description of a Paterson water-softening plant installed at the Baddesley collieries to treat a supply composed mainly of pit water with no permanent hardness but a variable amount of temporary hardness. To this, when necessary, well water of 17.2 gr. per gal. temporary and 6.5 per gal. permanent hardness is

added. The supply is used for boiler feed and make-up water and for pit-head baths and the plant is capable of treating a maximum of 7,500 gal. an hour.

The pit water requires treatment with lime and alumina, which must be supplemented by soda ash when well water is added. The water entering the plant is divided by an adjustable weir into a major and a minor flow propor-



tioned according to the hardness of the water. The major flow drives a water wheel which operates agitators in the chemical solution tank and the reaction and precipitation tanks. The minor flow passes through an "osilameter" which operates a reagent measuring bucket discharging the quantity of reagent necessary for treating the whole supply. Heavy sludge is deposited on the cone-shaped bottom of the reaction tank and discharged, and lighter impurities are removed by upward filtration through a wood-fibre strainer. *Iron & Coal Trades Rev.*, Anon., 1932, 125, 238. From *Summary of Current Lit.*, Water Poll. Res., VI, 1:2 (Jan.), 1933.

**Sterilizing Mains and Contaminated Pipe**—The cleaning and brushing out of pipes and protection from contamination during the laying process makes subsequent sterilization more effective. The New York Water Department requires sterilization of new mains by addition of enough calcium hypochlorite to the water entering the pipe to produce a chlorine

content of at least 3 p.p.m. If after standing for several hours and blowing out, the bacterial tests are unsatisfactory, a field chlorinator, whose construction and mode of action are described, must be used. The equipment should be installed on the highest possible point on a new main where a connection between the existing distribution system and the new main is available. The chlorine content, examined at hydrants by orthotolidin standards, should not exceed 3 p.p.m. on account of chemical reaction with the pipe coating.

After about 4 hours the machine is stopped and the chlorine solution allowed to waste slowly through the blow-off. When no residual chlorine is left bacterial tests are again made. The joints in large mains should be painted with saturated chlorine solution to aid penetration of the disinfectant into crevices. Similar precautions against contamination must be taken in repair work. W. W. Brush, *Canad. Engr.*, 63, 13:13, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 2:41 (Feb.), 1933.

## INDUSTRIAL HYGIENE

**Industrial Disease Commission Starts Job**—The newly appointed Commission on Industrial Diseases held its first meeting October 11, 1932. According to the statement by Governor Pinchot the Commission is composed of 10 members to represent the largest interests affected by any steps toward compensation for occupational diseases, and were chosen for their eminence and expertness and long practical experience in this field. The members are: A. M. Boyd, Alexander Fleischer, Wesley Graff, Thomas Kennedy, A. J. Lanza, R. V. Patterson, Louis B. F. Raycroft, H. F. Smyth, T. Henry Walnut and W. P. Yant.—*Month. Bull. Pennsylvania Dept. of Lab. & Ind.*, 19, 9:7 (Oct.), 1932.

E. R. H.

**"Occupational Diseases"**—Nearly all the European compensation laws and the laws of Illinois, Kentucky, Minnesota, New Jersey, New York, Ohio, and Porto Rico, list the occupational diseases which are compensable. In Connecticut, "occupational diseases" are defined, while they are undefined in the Longshoreman's Act and the District of Columbia.

*All injuries to health* arising out of the employment are compensable in California, Massachusetts, North Dakota, Wisconsin, Hawaii, and the Philippine Islands. For some 8 years—from 1919 to 1927—the Connecticut law was also in this class. In California, however, where the employment aggravates a preëxisting disease, only the aggravation shall be compensable.

There is no reported experience of awards other than "accidental" injuries in North Dakota, Hawaii, or the Philippine Islands. Consequently our

only experience with compensation for all "injuries" arising out of employment, whether "accidental," "occupational," or otherwise, has been in Connecticut, Massachusetts, and Wisconsin.

In Connecticut, "occupational diseases" are defined, in general terms, to include only the diseases "peculiar" to the occupation. Compensation is denied for aggravation of vice diseases and is "pro-rated" for acceleration of other diseases, while the provision permitting "waivers" due to preëxisting infirmities is broadened.

"There is a strongly organized movement for the general adoption of this mislabeled 'all inclusive method of covering occupational diseases.'" The International Association of Industrial Accident Boards and Commissions has endorsed it. And it is being widely represented that its adoption would add only 1 per cent to the cost of insuring compensation for "accidents" only. "But there isn't the shadow of a basis for such representation as to the cost." The cost of compensation for diseases is steadily rising, as in Wisconsin from 1.2 per cent in 1924 to 2.1 per cent in 1929. Such data as the National Council on Compensation Insurance has collected would indicate a loading of 3.5 per cent on pure premiums to meet the cost of occupational disease coverage. In contrast, the experience in New South Wales indicates that in certain occupations the cost of silicosis alone is somewhere between 7 and 10 per cent of payrolls. In Ontario, however, under the "schedule plan," it seems that, with emphasis on prevention rather than compensation, silicosis is being covered at a much lower cost.—From

*Ominous Abuses Threatening the Insurability of Workmen's Compensation*, by F. Robertson Jones, Gen. Man., Assn. of Casualty and Surety Executives, 1 Park Ave., New York City (Sept. 8), 1932, pp. 13-15. E. R. H.

**Occupational Disease and Compensation**—There are at the present time 27 occupational diseases in the New York Compensation schedule. For the year ending June 30, 1932, there were 655 claims of which 288 were disallowed, 196 awarded, with the balance pending or otherwise disposed of.

Of the total, 114 were due to lead, 113 to dyes, 67 to cleansers of one type or another, 34 to oil and grease, and the balance scattered through various headings. A detailed table shows the claims classified according to occupations and disposition of cases; another table, according to disease and disposition of cases; and another table according to disease and industry. A total of 163 occupations were represented. Most of the cases of dermatitis were listed under domestic and personal service and in the food industry. Lead poisonings were found almost solely in the metal and the building trades. Benzol poisoning (including dermatitis) was confined to the handling of dyed materials in the fur and clothing industry. Marked gaps still exist in the compensation law which result in great economic losses to workers.—Frieda S. Miller, *Indust. Bull.*, New York Dept. of Labor, 11:12-13 (Sept. and Oct.), 1932. E. R. H.

**Silico-Anthracosis**—A century ago the dangers of inhaling coal dust were accepted. At a later period, associated with a discovered low tuberculosis rate, they were discountenanced. Today, the dyspneic coal miner with his constant cough, associated chronic bronchitis and emphysema, black lung,

resistant and airless parts, with or without pleural effusion or abscesses, and with an abnormally high silica content, is again becoming of serious concern.

Historically, these phases have been associated with the names of Pearson (1813), Thomson (1837), Stratton (1838)—who devised the term "anthracosis," and Greenhow (1869) who extracted 30 per cent of silica from the lung ash of a collier who had died from miners' phthisis. Virchow (1858), however, convinced himself that the pigment in the lungs was not inhaled carbon but altered hemoglobin and therefore endogenous in origin and even Jousset (1928) expressed the same view. Villaret (1862) propounded the idea that anthracosis came not by inhalation but through the intestinal route and Calmette (1907) and his pupils reiterated this view. However, Vincent (1907), Basset and Cave (1907), Cobbett (1910) and Findlay (1911) were unable to produce pigmentation of the lungs by feeding animals with soot or pigments, but they did produce pigmentation by inhalation. Thus, anthracosis today is considered as caused by inhalation only.

While it is probable that the recent work of Cummins and Weatherall (1931) explains the immunity to tuberculosis on the basis that coal dust absorbs the active principle of tuberculin, the other gross pathology—bronchitis, emphysema and fibrosis—must not be forgotten. Nor are the finer particles of dust alone responsible, since, in asbestos workers, particles measuring from 40 to 100 and even up to 360 microns in length have been encountered within pulmonary alveoli.

Oliver (1909), Collis (1915), Tattersall (1926), and others have also proved beyond reasonable doubt that there is a serious impairment of lymph drainage in the lungs of coal miners by the action of silica.

A case history with autopsy is described of typical "silico-anthracosis" in a soft coal miner who had no other employment throughout a long life and whose lungs showed extensive fibrosis, occasional fibrous whorls, emphysema, carbonaceous deposits, and masses of golden yellow pigment, as well as black angular particles measuring from 10 to 80 microns in length. In many respects, curious bodies were seen which have been considered typical of asbestosis only. Still, the case in question had had no exposure to strata containing iron ore or large amounts of silica. The constancy of the peculiar bodies in asbestosis is therefore questioned.

The present case lends strong support to the theory that anthracosis is primarily a silicosis and that it occurs not only in hard coal miners but also in workers in soft coals.—W. E. Cooke, *J. State Med.*, 40, 12:702-708 (Dec.), 1932. E. R. H.

**Cleanliness in Industry**—This is an address presented before the Annual Convention of the Linen Supply Association of America held at West Baden, Ind., May 26, 1932.

Disraeli, the great English statesman, said, "Although it is humiliating to confess, yet I do confess that cleanliness and order are not matters of instinct; they are matters of education and like most great things, mathematics and classics, you must cultivate a taste for them."

Definitions are given and the article discusses personal responsibility, the bettering influence of woman in the case, workplace cleanliness, more stress upon health, industrial diseases and personal cleanliness, special wearing apparel, indoor clothing and health, light and health, sanitary laws and regulations, cosmetics and cleanliness, and the necessity for publicity.

It was found by a medical director

of a large automobile company in Cleveland that "machinist's boils" could be effectively prevented by supplying workers liberally with cloth towels for the purpose of frequent mechanical cleansing of the hands and arms from grease and dirt. An argument is also presented for the use of special clothing of durable and washable nature, such as linen suits, aprons, caps, etc., for use in many industrial processes.

It is concluded that cleanliness in industry promotes health, safety, and efficiency. It revolves about conservation measures of relative importance. It is secured less by appeal to reason than appeal to pride and idealism. Definite rules for guidance should be set up. Education by various methods should be a consistent and persistent feature. Discipline and penalties are important but secondary to incentive and appeal. This means organization, planning and supervision. Leaders and leading plants should set examples and make demonstrations. Education and publicity should be upon a research basis which will develop facts. Everything which succeeds runs the gauntlet of severe competition. Ruskin once said "There is hardly anything in this world that some men cannot make a little worse and sell a little cheaper."—Emery R. Hayhurst, *Annual Report*, Linen Supply Assn. of America, 1932, pp. 23-30. E. R. H.

**The Employment of Women in Vitreous Enameling**—This is a study of the enameling departments of about 50 plants, practically all making stoves, and of home interviews with nearly 700 women employed in those plants at the time or within the 12 months preceding the interview. The survey was made with the coöperation and scientific assistance of Dr. Alice Hamilton.

The workers are to a great extent youthful, more than three-fourths being

under 30 years and more than one-fourth under 20. In some places the work is done with a leadless glaze, thus obviating a definite hazard. Two groups of women make up the larger number of employed in this enamel work—sprayers and brushers. The former are much more exposed to lead, also much of their work is done on cast iron having a cover of lead enamel, while the latter are chiefly employed on sheet iron for which a leadless enamel is generally used.

Over 50 per cent more sprayers than brushers complained of metallic or sweetish taste, indigestion, constipation, and menstrual disturbances, while they also had a higher rate of absences due to ill health (than the brushers). Nearly one-fifth of the sprayers had left work because of illness while less than one-tenth of the brushers gave illness as the cause. While no definite evidence of lead as a race poison was ascertained—sterility, miscarriages, stillbirths, and infant deaths—the data on this point correspond significantly.

Strict medical supervision is recommended, also adequate provisions for cleanliness. In a great majority of states the statutes are quite inadequate to cover this hazard. Leadless enamels should be furthered.—*Fourteenth Annual Report*, Director of the Women's Bureau, 1932, pp. 5-7. E. R. H.

**Occupational Diseases in Germany**—According to German official statistics for 1930, the number of cases of occupational diseases in that year was 5,920 in industry, 937 in public institutions and 7 in agriculture.

Occupational diseases in industry represented 0.84 per cent and those in public institutions 1.08 per cent of the total number of accidents and illnesses occurring in these two branches respectively.

The number of cases compensated in 1930 was 647 in industry, 118 in public

institutions and 4 in agriculture, the percentages in relation to the total numbers of accidents and illnesses compensated being 1.48 in industry and 1.52 in public institutions. The number of cases of occupational diseases followed by death was 94 in industry and 13 in public institutions.

In mines the number of cases of sickness compensated for the first time in 1930 was 1,795. The number of fatal cases was 356.

The most frequent occupational diseases were lead poisoning (2,215 cases reported, 269 compensated and 8 fatal in industry); silicosis (1,719 cases compensated and 352 fatal in mines; 848 reported, 202 compensated and 1 fatal in industry); infectious diseases (562 cases reported, 19 compensated and 8 fatal in industry; 696 reported, 87 compensated and 10 fatal in public institutions); and carbonic acid poisoning (644 cases reported, 46 compensated and 32 fatal in industry).—*Indust. & Labour Inf.*, XLIII, 11: 355-6 (Sept. 12), 1932. E. R. H.

**Patologia da Solventi e Misure Igieniche e Profilattiche (Relazione)**—This bulletin of 19 pages, from the 10th National Congress on Industrial Medicine held at Milan, April, 1932, carries 5 extensive infold tables pertaining to critical data on no less than 125 solvents and diluents of industrial significance from the point of view of toxicity. There is also a special discussion of the combinations of cellulose, or solvents in general, plastics, diluents and pigment colors, and a short bibliography.—Professor L. Carozzi, Milano, *Tipografia Antonio Cordani S. A.*, 1932—X. E. R. H.

**The Control of Discharged Gases and Fumes from Ventilating Systems**—An illustrated article giving the chief features to be considered in preventing the return of discharged gases

and fumes into the working quarters, and the protection of the public. Special description is given of a method for controlling the fumes of nitric acid and its oxidation products.—John Vogt, *Indust. Bull.*, New York Dept. of Labor, 11, 12:367-8 (Sept.), 1932.

E. R. H.

**Governor's Health Commission Industrial Recommendations**—In 1930, the Governor appointed an informal commission of 14 members to study and report upon the administrative and legislative aspects of public health in New York State. The committee found, so far as industrial relations go, that there were 60,000 workplaces and over 3,000,000 industrial workers in the state; also, that the state expends \$36,000,000 annually on compensation, and only \$800,000 on prevention. The various recommendations and comments of the Committee on Industrial Hygiene are discussed in brief.—Adelaide Ross Smith, *Indust. Bull.*, New York Dept. of Labor, 11, 13:400 (Oct.), 1932.

E. R. H.

**The Medical Aspects of Industrial Accidents**—This article (in English) considers in detail various working conditions, the worker, and social conditions considered provocative of industrial accidents. It seems inconceivable that at a time when industrial establishments and organizations claim to be "scientific" in their methods, 36.5 per cent of accidents are still attributable to undetermined causes, 26 per cent to causes incapable of elimination, and 45 per cent to unforeseen causes. It is maintained that no little part of this discrepancy lies in the predisposing causes discussed in the body of the paper.

A safety service in industrial establishment is, of course, of value, but a study of the "human factor" and the influences motivating him or failing to

motivate him is of far greater importance. A lesson should be taken from the methods used in the selection of candidates for aviation work.—L. Carozzi and A. Stocker, *Arch. f. Gewerbepath. u. Gewerbehyg.*, 4, 1: 14-41, 1932.

E. R. H.

**Medical Service in a Chemical Industry**—This article by the Medical Director, E. I. duPont de Nemours & Co., discusses the matter of selection, protection, and treatment of workers exposed to various chemical poisons, with a summarizing statement as follows: (1) Every industrial physician should have a working knowledge of his entire plant; (2) every new employee should be carefully examined and selected in such a manner as to enable him to work efficiently, safely, and without undue injury to his health; (3) every industrial physician should protect the health of his workers by (a) frequent periodic examinations, (b) frequent inspection of the working conditions in the plant; (4) treatment is dependent upon early detection with immediate correction of the cause or removal of the worker; and (5) the entire service is dependent upon three principles: selection, protection, and treatment.

A valuable 3-paged discussion by various industrial physicians, hygienists, and research workers follows, concerning rayon, sulphuric acid, solvents for Duco, carbon tetrachloride, tetraethyl lead, and especially methanol.—G. H. Gehrman, *Bull. Am. Assn. of Indust. Phys. & Surg.*, 6, 2:1-7 (Oct.), 1932.

E. R. H.

**Silicosis in the Foundry**—This is a rather extensive bulletin on the subject of the characteristics, control, and compensation of silicosis as related to foundry work. The types of dusts, how silicosis is produced, special features about silicosis, its stages and progress,

dangerous concentration of silica dusts, and treatment, comprise Part I.

Part II is devoted to control of silicosis in the foundry, suggesting a tentative program in casting cleaning operations. Part III goes into detail in the matter of compensation with a discussion of blanket coverage for occupational diseases, the Ohio situation in which the claimant with silicosis is helpless under the present state law, shifts in position as respects jury decisions, incentives to systematized compensation, "no specialized legislation is needed for silicosis," silicosis is unlike other occupational diseases, meeting the silicosis claim, and special features for silicosis as regards compensation.

In the discussion, E. O. Jones, of the Belle City Malleable Iron Company, Racine, Wis., recites in interesting detail the recent history of the industrial aspects of silicosis in that state, and the attempt to meet the situation, which is involving an enormous total for claims, through a code prepared by the Industrial Commission covering dust, fumes, vapors, and gases. It is felt that the most effective way to meet the challenge is through prevention and control—in other words, Good House-keeping.—Carey P. McCord, *Spec. Bull.*, National Founders' Assn., 29 S. LaSalle St., Chicago, 1932, 46 pp.

E. R. H.

**Silicosis**—This brochure of 21 pages is written especially for the use of persons interested in the protection of industry and its employees. It discusses the nature of silicosis and related dust effects upon the lungs, how silicosis is contracted, how detected, and the compensation experiences in the laws of various countries; likewise, how industry can protect itself and its employees, and the essentials to be considered in the defense of claims. The brochure is pitched in language adaptable to the

intelligent layman.—C. O. Sappington, 1932, *Industrial Relations*, 844 Rush Street, Chicago.

E. R. H.

**Pneumoconiosis**—The authors direct attention to pneumoconiosis arising in connection with grinding and polishing of metals by artificial abrasives, particularly emery wheels. At present such work is not included in the schedule of occupational diseases for which compensation is allowed (England and Wales).

Six case reports are detailed, 4 with post-mortem findings, to support the contention that dust from occupations other than those included in the schedule may cause pulmonary fibrosis and produce a condition clinically and pathologically indistinguishable from silicosis. Reference is also made to the findings of Middleton (1923) that emery dust may give rise to pulmonary fibrosis. It seems advisable therefore to safeguard those who are employed in grinding and polishing metals with artificial abrasives.

The necessity for necropsies by skilled pathologists is emphasized in order to bring to light more information on deaths among those suspected of having pneumoconiosis.—J. R. Todhunter and G. B. Dixon, *Lancet*, 5699: 1123-1126 (Nov. 19), 1932.

E. R. H.

**Pneumoconiosis**—The only general inference which can be drawn on the present information of the Factory Department of the Home Office is that fatal cases of fibrosis of the lungs occur in those industries in which there has been a risk of exposure to silica or asbestos dust.

This is not to say that exposure to dust of artificial abrasives may not cause disablement or death—only that the case is not established. While there are some thousands of persons engaged in occupations involving the use of artificial abrasives, there does not appear at present to be any conclusive evidence to show

that disablement or death from pulmonary disease follows as a result of such employment.

The group "metal glazers, polishers, buffers and moppers" does not represent a pure exposure to artificial abrasives since many have worked on grindstones and inhaled silica dust so that statistics of this group do not reflect the effect of artificial abrasives.—John C. Bridge, H. M. Senior Medical Inspector of Factories, *Lancet*, 5701:1249-1250 (Dec. 3), 1932.

E. R. H.

**Soda and Its Compounds**—The ammonia-soda process is described and illustrated by chart as well as the extent of operations in the United States and Canada. The health conditions found in 5 plants are given, followed by a more detailed discussion of the manufacture of soda ash and caustic soda by the LeBlanc and the electrolytic processes. The potential health hazards are considered to be: dampness, fumes and odors from ammonia and carbon dioxide gas and carbon monoxide, and dust. The resulting occupational diseases involving the skin and the mucous membranes as well as the nervous system are reviewed from standard works as well as from a report by C. C. Payson of the Connecticut General Life Insurance Company. A classification and index of jobs shows the chief hazard in connection with each.—*Industry Report*, Retail Credit Co., 7, 11:127-137 (Nov.), 1932.

E. R. H.

**Chrome Poisoning Outbreak**—Although chrome poisoning has been named as an occupational disease in the New Jersey workmen's compensation law since 1924, no claims therefor

were ever made until early in 1932. Suddenly, 95 claims were filed from employees in the same chemical plant, nearly all of whom were "laid off." Medical questions were by mutual agreement referred to two specialists as medical referees and their findings were made the basis of the awards. The awards averaged \$500 payable in installments of \$20 per week for 25 weeks, based upon an average rating of 5 per cent disability. Fees to the applicants' lawyers and doctors, including the medical referees, were limited to 25 per cent of the amounts of the awards, payable one-half each by the beneficiaries and the employer respectively. The nasal passages were (apparently) the chief location of damage.—*Newark Evening News*, June 6, 1932, quoted by the *Bulletin, Assn. of Casualty & Surety Executives*, 31:7-8 (Oct.), 1932.

E. R. H.

**The Health of Chromium Plating Workers**—The article discusses chromium plating as a commercial undertaking in the past 6 years and the occurrence of various occupational diseases, such as chrome holes, nasal ulcerations, dermatitis, and certain constitutional symptoms of which vomiting is the most prominent; also, the prevention of the ill effects encountered.—H. B. Trumper, *J. State Med.*, 40, 12:696-701 (Dec.), 1932.

E. R. H.

**Workmen's Compensation in Pulmonary Disease**—A description of the various British Acts and Schemes covering compensation for industrial pulmonary disease, especially silicosis and asbestosis.—Charles L. Sutherland, *J. State Med.*, 40, 12:709-716 (Dec.), 1932.

E. R. H.



## FOOD AND NUTRITION

**Cobalt in Animal Nutrition—**As a result of experiments reported previously (*A.J.P.H.* 22:664, June, 1932) that a polycythemia was produced by the addition of cobalt to a milk-iron-copper diet, a study was made of the cobalt content of normal rats and those in which a polycythemia had been produced by cobalt feeding. A rapid colorimetric method for the estimation of cobalt in biological materials is given. This is applicable to a sample containing 0.01 to 0.5 mg. of cobalt. In an attempt to detect cobalt in the body of an animal which had been fed cobalt, rats were fed a basal diet of milk fortified with iron, copper, and manganese sufficient to supply each rat with 0.5 mg., 0.05 mg., and 0.04 mg., respectively, per day. Some rats remained on the basal diet while others were given cobalt in amounts varying from 0.1 to 2.0 mg. per rat, daily. In no case was cobalt definitely detected in those rats receiving added cobalt. With young rats receiving more than 0.6 mg. of cobalt per day the rats rapidly lost weight and at 2.0 mg. the rats survived only for a period of 2 weeks.

For the study of the distribution of cobalt in the tissues, pigs were used because they could be fed larger amounts and the organs offered larger samples for analysis. Four pigs were given only whole cow's milk *ad libitum* to which were added daily 25 mg. Fe, 5 mg. Mn, and 2 mg. Cu. Two pigs received in addition 25 mg. of cobalt.

The pigs were 2 weeks old when the experiment was started. One pig from each diet was killed at the age of 7 weeks and the other 2 were killed at 12 weeks. Cobalt was found to be relatively absent in the tissues of the pigs which received no cobalt. In those receiving cobalt, the greatest amount was

found in the liver, pancreas, and spleen. The vertebrae and ribs contained 1.98 mg. of cobalt per kilo of dry material and the long bones contained an amount undetectable. It is suggested that perhaps the vertebrae and ribs are more active in erythrocyte formation and this may be where cobalt exerts its effect in producing a polycythemia. F. J. Stare and C. A. Elvehjem, *J. Biol. Chem.* 99:473 (Jan.), 1933.

**The Effect of the Prolonged Feeding of a Milk-Iron-Copper Diet to Rats—**Three groups of rats were studied. The animals in Group I were placed in individual glass cages at the weaning age and were fed whole milk *ad libitum*, supplemented by 0.5 mg. of iron and 0.025 mg. of copper 6 days a week and were continued on this diet until they were 346 to 395 days of age. All of the rats showed erythrocyte counts only slightly lower than those of the control animals. The body weight averaged 317 gm. Autopsies revealed no gross abnormalities. The animals in group II were kept on the milk-iron-copper diet from the time of weaning until they were from 450 to 454 days of age. The hemoglobin, erythrocyte and cell volume values were almost identical with those found in group I. Autopsies showed no gross abnormalities.

The animals in group III at time of weaning were placed on an exclusive whole milk diet until a severe nutritional anemia developed, when supplements of iron and copper were added. 6 days a week. One rat received 0.05 mg. of copper and one received 0.025 mg. of copper. Both promptly recovered from the anemia and were continued on the milk-iron-copper diet until they were 667 days of age. Al-

though the rats in group III were about 11 and 7 months older than the rats in the other groups, the blood findings agree with those found for the first two groups. In general, all of the animals appeared to be in good nutritive condition. While these results cannot be regarded as final evidence for the completeness of an exclusive milk-iron-copper diet for rats, the data indicate that such a diet will maintain rats in an apparently normal condition for long periods of time.—F. Aline Underhill, James M. Orten, Edward R. Mugrage, and Robert C. Lewis, *J. Biol. Chem.* 99:469 (Jan.), 1932.

**A Note on the Calcium Content of Cabbage**—Great variations in the calcium content of cabbage leaves from different parts of the plant were found during the course of feeding experiments. Samples were obtained in the market during the month of June. The heart leaf ran reasonably uniform during 5 experiments, the variation in calcium running from 26 to 32 mg. per 100 gm. of moist leaf. The inner pale green leaf varied from 35 to 71 mg. while the outer dark green leaf varied from 476 to 1,058 mg. on the same basis. The latter figure represents more calcium than is found in any other common food, except cheese. Reference is made to the fact that food analysis tables in common use do not mention the high calcium values in the outer leaves of cabbage.—Stuart Jasper Cowell, *Biochem. J.* 26:1422, 1932.

**Mussel and Clam Poisoning**—In 1927, there were 100 cases of mussel poisoning and 7 deaths. Since that year the California Board of Public Health has quarantined mussels during the summer months when these are toxic, the period of embargo terminating September 30. The poisoning was studied by Dr. Meyer of the Hooper foundation for Medical Research, who

found that shellfish become toxic during the spring and summer but not toxic during the winter months, the peak of toxicity occurring in July. In experiments performed at the Foundation, it was found that mussels, particularly toxic to animals, could be rendered less toxic by cooking in bicarbonate of soda;  $\frac{1}{4}$  ounce of soda to each quart of water destroyed 85 per cent of the poison if cooked 20 to 30 minutes. It was found that clams may be equally toxic but that fewer cases of poisoning are reported owing to the fact that the intestines of the clams are generally discarded.—Weekly Bulletin, California Dept. of Public Health, 12:7 (Feb. 11), 1933.

**Increasing the Vitamin D Content of Milk. II. The Effect of Feeding Cows a Cod-Liver Oil Concentrate (Vitex)**—A previous paper reported the effects from feeding large amounts of irradiated ergosterol to cows (*A.J.P.H.* 22:1004, Sept. 1932). This work reports the use of a cod liver oil concentrate commercially known as Vitex. Holstein cows were used and were fed on a basal ration of beet pulp, corn, oats, wheat bran, linseed oilmeal and salt. After 17½ days on this ration, milk and fat production was calculated and the cows divided into groups so the total milk and fat production was approximately equal.

Five feeding periods of 21½ to 32 days were employed for both groups, alternating the basal ration the first, third, and fifth periods with Vitex in the second and fourth. At the end of each period the cream was churned into butter and pure butterfat used for vitamin D assay. Some increase in the vitamin D was observable with all additions and the increase directly proportional to the amount of vitamin D fed. When 60,000 rat units were fed the milk contained 30.35 Steenbock rat

units compared to 2.76 rat units per quart without vitamin D feeding. No adverse conditions were noted during the Vitex feeding and apparently no other effect in the milk and fat production except the decrease which the authors regard as normal toward the end of lactation.

Comment is made that the increased

potency, 30.35 rat units per quart, is much below the 160 units generally recommended for rachitic infants. Furthermore, the cost of Vitex feeding renders this source of vitamin D as impracticable.—W. E. Krauss, R. M. Bethke and Willard Wilder, *Bimonth. Bull.*, Ohio Agri. Exper. Sta., 18:15 (Jan.-Feb.), 1933.

## CHILD HYGIENE

### MILK FOR CHILDREN IN THE EMERGENCY

EVIDENCE is accumulating which points to serious nutritional disturbances among large numbers of our preschool children. Undoubtedly this is the group which is suffering most during the depression. It is difficult to secure social control of these children and to make certain that they are getting an adequate and balanced ration. Recent examinations of such children in day nurseries and preschool centers indicate a relaxation of nutritional standards among them.

The greatest lack seems to be in their daily consumption of milk, which has dropped, in some places, to less than a pint a day. Milk is supremely important in this age group. At least 1 quart a day of milk should be assured to every preschool child. At present the child has to take its chances in securing enough milk from the family ration. The relief agencies, on the whole, are not furnishing enough milk to families with 2 and 3 preschool children.

In recommending quantities of milk to be used in the low-cost diet, the U. S. Department of Agriculture stipulates:

... 1 quart of milk daily from early childhood to adolescence, and 1 pint or more daily for the adult. For a family of 5 consisting of father, mother, and 3 children under

14 years, this makes a weekly milk order of 28 quarts. When shortage of money forces the expenditure for food to an abnormally low level, the proportion spent for milk should be increased.

Many families are receiving not over 8 or 10 quarts of milk per week. This is entirely too low for the optimum nutritional needs of children. A recent bulletin from the National Dairy Council observes that

... when properly approached, relief agencies are readily convinced of the practical necessity and economy of milk in the relief food budget. For instance, in Chicago the expenditure for milk has been increased to about 30 per cent of the food dollar. This assures a pint of fresh milk for every child. While not an adequate amount it is a step nearer the nutritional standard used in most cities. The Chicago Milk Foundation has been instrumental in bringing about this division of the Chicago food relief dollar.

The National Dairy Council recently has made a survey of the expenditures for relief work last year in some of the cities with local dairy councils. It reports that

... it is evident from replies received that the amount for unemployment relief appropriated in some Dairy Council cities during the period July, 1931-June, 1932, is very impressive. It has been impossible to obtain complete figures in all Council cities. However, in 17 city centers, having a total population of 13,243,328, \$75,437,208 was spent for relief work. Of this amount, ap-

parently about \$12,220,000 was appropriated by the States, the balance being city appropriations and volunteer contributions.

But when we try to find out how nearly the food portion of this budget was expended in accordance with good nutrition standards, it is necessary to take figures from a few cities in which methods of distribution make such records available for this study. If we accept the average of several cities as conservative estimates, then 75 per cent to 90 per cent of the relief funds was spent for food and the balance for housing, clothing, medical care, etc. Of this food expenditure, the proportion used for fresh milk varied from 2 per cent to 16 per cent. In only two cities reports indicate the higher figure. In this connection it is interesting to note that the expenditure for milk is greater in all Council cities than in a number of comparable cities without Council work.

In a study of food order of 2,558 Associated Charities families in Cleveland, Ohio, during one week in December, 1932, it was found that of the total order of \$7,959.03, \$903.85 was spent for fresh milk, \$406.94 for evaporated milk, and \$13.35 for buttermilk. In other words, 16.63 per cent of the total food bill was spent for milk. Reduced to quarts this would mean about 8 quarts per family per week. It is recognized that some milk was delivered directly to the families; but this was not enough to affect seriously the figures given.

The National Dairy Council bulletin continues:

The dairy industry is very vitally interested in the proportion of the emergency relief food dollar that is being spent and will be spent for fresh milk. The milk producer and dealer are most directly affected, but the matter has an important bearing on the total expenditures of relief agencies for all dairy products. The extensive preparations for increasing such relief in the winter of 1932-1933 bring the matter into special prominence at the present time.

This year with national and state participation, there will be greater overhead control; therefore, greater uniformity of procedure and fewer officials with whom to deal. This offers the fresh milk industry a distinctly greater opportunity than last year to influence authorities to utilize more fresh milk

in relief work. The total consumption of all forms of milk in emergency relief is now much below even minimum nutrition standards. Nutrition authorities are agreed that for an adequate diet at least one-fifth of the food money should be spent for milk. This standard set by Dr. Sherman was qualified by him last winter in a bulletin, *Emergency Nutrition*, in which he stated, "When shortage of money forces expenditure for food to an abnormally low level, more than one-fifth (perhaps one-third) should therefore be spent for milk in some form."

The comparative economy of fresh milk can be readily demonstrated to open-minded officials. In almost every city there is already a nutritional committee or group to whose prominence the welfare people will give careful attention. In some cities these committees are an integral part of the welfare organization.

The objective of the milk industry is to secure the expenditure for fresh milk of not less than \$.20 of each 1932-1933 food relief dollar. According to present information, the amount of money that will be spent for food through relief agencies will total three-quarters of a billion dollars.

In the October 1932 issue of the *Dairy Council Digests* the importance of milk in the child's dietary during a period of national distress is clearly set forth:

Experience as well as research has proved the wisdom of laying particular stress upon the diets of children. Curtailment of children's diets in European countries during the World War was followed by outbreaks of dietary deficiency diseases. It is a well known fact, however, that serious undernutrition may result even when such deficiency diseases do not threaten. The American Medical Association points to the fact that, "Prolonged general underfeeding may often be more insidious in its effects than are specific inadequacies that result in such diseases as scurvy, rickets and pellagra." This fact has been recently demonstrated by the condition of children in Germany. Observation on nearly 4,000 school children shows that classes starting in 1924, 1925, and 1926 are not making progress in their school work that classes starting later are making. The difference is ascribed by the City Health Department of Berlin to the fact that the former children were born during the war years, 1917-1919, in which their nutrition was especially inadequate.

Under the most favorable circumstances, a wise selection of food and the proper feeding of a family requires knowledge and skill. But when every dollar must bring the greatest return in nourishment and satisfaction, the task becomes more difficult. In the present economic crisis, with its resulting reduction in income and employment, the problem of obtaining an adequate diet at a minimum cost has become a universal one.

It has been well said that, "A time of emergency is an excellent period in which to teach the scientific lessons that necessity forces on us." And the "teachers" who have responded in the present "necessity" are those leaders in nutrition who represent public and private agencies interested in the health and well-being of the people.

It is fitting that the U. S. Government Bureaus took the initiative early in the depression period in pointing to the necessity of spending the "food dollar" properly if it was to protect the health of citizens. Other agencies rapidly followed the lead in the crusade for adequate diets and sounded a warning to nutrition leaders of the consequences of relaxing their vigilance in maintaining dietary standards. From the first, these agencies have urged that food money be spent for food that would "feed" not merely

"fill," and that the so-called "protective" foods—milk, fruit, vegetables and eggs—be accorded their rightful place in emergency diet.

Research studies have long since established, and recently confirmed, the fact that a child requires 1 quart of milk daily for the satisfactory growth of the bones and teeth. One pint of milk covers the adult's daily need. A question frequently asked at this time is, "Does the fact that the food fund is reduced alter this rule?" Dr. Sherman answers this question, in effect, when he says that, in cases where the food fund is reduced to a minimum, "The dietary should be built around bread and milk. The lower the level of expenditure," he continues, "the more one must forego other foods and concentrate effort upon providing these two, supplemented by a little of some inexpensive fruit or vegetable."

Gillett and Rice found that city families added to the nutritive value of their diets without increasing the total cost when they bought more milk and cheese. Families spending 25 per cent of the food fund for milk and cheese obtained a diet higher in calcium and in vitamin "A" and for less total outlay of money than when only 19 per cent of their food fund was spent for milk and cheese.

## PUBLIC HEALTH NURSING\*

**Our Rôle in Communicable Disease Control**—The nurse's main objects in a communicable disease program are control and prevention. To attain these objects she must know five fundamental factors:

First, what communicable diseases account for the greatest number of deaths? The White House report gave the following communicable diseases in the order named accountable for the greatest number of deaths under 20 years of age: bronchopneumonia, tuberculosis, lobar pneumonia, diphtheria, whooping cough, influenza, measles, typhoid fever, pneumonia, syphilis,

scarlet fever, dysentery, meningococcus meningitis, malaria, poliomyelitis, tetanus, epidemic encephalitis, gonorrheal infection, mumps, smallpox, and rabies.

The degree of disability caused by the disease, the prolonged convalescent period, and the resulting handicaps, are other important factors besides death which determine the seriousness of the disease.

Second, which of these diseases should be selected for concentration of effort in control and prevention? Usually tuberculosis, diphtheria, whooping cough, measles, typhoid fever, syphilis, scarlet fever, and smallpox are the ones most commonly selected for this purpose.

Third, at what age is death most

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

prevalent from these communicable diseases? (White House Conference *Report of the Registration Area of the United States for 1926, 1927, 1928*).

	Per Cent Total Deaths Under 20 Yrs.	Per Cent of Deaths Under 1 Yr.	Per Cent of Deaths Under 5 Yrs.	Per Cent of Deaths Under 10 Yrs.
Tuberculosis	16.0	1.5	4.5	
Diphtheria	94.3	7.0	58.5	86.5
Whooping cough	99.6	57.2	95.9	99.1
Measles	94.5	24.9	76.4	88.2
Typhoid fever	39.4	0.6	4.7	11.7
Syphilis	24.5	18.9	21.3	21.9
Scarlet fever	85.7	4.8	43.6	70.9

Any nurse could study out the above White House Report figures and put alongside them the figures for her own state.

Fourth, what control measures are commonly used?

A good method by which to classify tuberculosis cases is to divide them into four groups: active, arrested, contacts of known cases, suspects. It is well then to concentrate on the active cases with a close check-up of their contacts.

The public health nurse's greatest contribution in the control of diphtheria is the lesson she causes to sink in as to the need of immunization.

The nurse can do little in whooping cough control without the coöperation of the family and teachers. Teaching the dangers of this disease to the infant and the preschool child and providing for the isolation of this group are her most important tasks here.

Probably education to rule out the mistaken idea that measles is a mild disease is the nurse's strongest weapon.

In the matter of typhoid fever, not immunization but sanitation and the control of the carrier are the means of prevention.

Education with no judgment as to the moral issue is the nurse's cue in

syphilis. Some educational plan should be part of every clinic service.

In scarlet fever, isolation and the complications caused by the disease are the nurse's main teaching points.

Smallpox causes very few deaths nowadays, but this would not be the case if there were no continuous plan for vaccination of the young, which the nurse must always keep foremost in her mind.—Frances F. Hegar, *The Nurse in Communicable Disease*—Paper read at Annual Conference of Health Workers in Tennessee, Fall of 1932.

**The Summer Round Up Is a Great Opportunity for Public Health Nurses**—In 1925 the Summer Round Up idea of the National Congress of Parents and Teachers was launched, and now it is quite generally recognized as one of the most constructive projects for the promotion of child health. In 1925, 52 associations in 22 states carried through the Round Up compared with 2,739 associations in 47 states in 1931. At first the primary interest in the Round Up was in the physical health only of the children entering school for the first time in the fall; now the attending physician also gives attention to the child's mental health. No longer is the value of the Round Up considered to depend upon the defects discovered or corrected, but rather on the number of parents who have assumed the responsibility for the health of their children.

Here are some contributions public health nurses can make to insure successful Round Ups in their communities:

1. Be a member of a Round Up Committee and see that the proper contacts are made with the medical and dental professions.
2. Be free to assist the examining physicians in their group examinations, insisting that each physician be given enough time to go over each child thoroughly and discuss his findings with the mother.

3. Serve as chairman of the follow-up committee. As such she can instruct the lay group in the most effective methods of making home calls. It is the follow-up work which largely determines the success of the Round Up.

4. The nurse is the best one to make the fall check up when the children bring in their signed slips.—

Lillian R. Smith, M.D., Progress of the Summer Round Up, *Pub. Health Nurs.*, XXV, 2:92-94 (Feb.), 1933.

School Nurses Can Use This—"Guidance Leaflet No. 15," U. S. Government Printing Office, Washington, D. C.—price 5¢—is on nursing and is endorsed by the National League of

Nursing Education. It is a "leaflet of a series on college counseling and advising for the professions; what the occupations are; what preliminary education is required; where professional training is offered; length of training; student budgets, and selected references. . . . The series is designed for use of high school and college students, orientation classes, guidance classes, guidance committees, counselors, teachers and parents." School nurses who are frequently called upon to advise girls about going into nursing will find this leaflet very valuable. E. F. M.

## EDUCATION AND PUBLICITY\*

Both Right and Wrong—The following from M. A. Auerbach, Indiana Tuberculosis Association:

Today I happened to look over the November, 1932, issue and read the paragraph "Syndicated Health Columns." I find that in that you list among the health columnists "Dr." Frank McCoy. I wonder if this is the same Frank McCoy who was exposed by the American Medical Association several years ago. If so, Frank McCoy is not an M.D., nor so far as anyone can learn, is he a doctor in any sense. In the April and August, 1927, issues of *Hygeia* will be found articles on "Misinformation by Dr. Frank McCoy." Perhaps because the November issue of the *American Journal of Public Health* came while we were busy with the Seal Sale I went over it more hurriedly than is my practice, and therefore did not notice this before. Of course, you made no comment regarding "Dr." McCoy, but I think it is usually taken that, including him as you did among the health columnists, many of the readers would consider that his writings and information are approved.

Right: "Dr." McCoy is the Frank McCoy. Wrong: The list was given

as a matter of news, and with the hope that some reader would raise questions. You saved the day.

Child Health Education Memoranda—Several memoranda have been prepared for the busy grade teacher who is not a specialist and who wishes to learn where to turn for sound, easily accessible and inexpensive educational material and advice. The titles listed below are supplied by Social Work Publicity Council, 130 East 22d St., New York. 3 cents each.

"Plays—Health," 2 pp. Sources for securing plays and information about play production.

"Posters in School Health Education." 1 p. Source list; warning against undesirable posters; emphasis upon school-made posters.

"Home-Made or School-Made Posters." 1 p. Free and inexpensive manuals on making posters.

"Addresses for Poster Mounts and Rubber Stamp Letters." 1 p. A variety of materials for use in making posters.

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

"Books on Marionettes and Puppets." 2 pp. Annotated list of books about them and how to make and produce them.

To readers of the *Journal* outside of Canada and United States: copies of the above memoranda will be sent free without enclosure of postage.

For motion picture information see "Motion Picture Memoranda" in this issue.

**Public Health Education**—Two papers, in the Feb., 1933, *Journal*, were given at a session which was a high spot in the 1932 program of the Public Health Education Section. "Motivation in Health Education," by Benjamin C. Gruenberg, was presented in everyday language, illustrated with examples from every-day experiences.

"The Psychology of Public Education," by Edward S. Robinson:

My proposal is that we need to face the problem of public intelligence in the same humble spirit in which the man of science faces other complex realms of natural fact. We need not make a mystery of the public mind. We need not overlook such solid information as we actually possess. But we do need to give up over-confidence. You who have the urgent and practical need to make widespread education effective in matters of health may feel that this plea for an attitude of honest ignorance is a council of despair, but I do not intend it as such. I mean merely to indicate my distrust in the rules and tricks of public appeal which you may obtain for the asking from many confident publicists. . . . If widespread health education is to be continued on its present scale, it would pay you to set up, as the public museums have done, an experimental center where objective standards of educational efficiency can replace the hunch of the artist, the poet, and the advertising man.

Are we overlooking a source of inspiration and ideas if we fail to read *Journal of Adult Education*, 60 East 42d St., New York? Health education is seldom mentioned, but that may make it all the more stimulating and useful to those who wish to get out of

the routine of purely professional thinking. Take a chance, send 75 cents for the Jan., 1933, quarterly issue. We wish that all program committees would read "Panel" and "Panel Postscript" which tell of a method for conducting meetings and convention sessions.

**Wide Representation at Health Education Institute**—The classification which follows shows the connections of those who were registered for the Institute at Washington.

Public health departments: state or province, 11; district, 2; county, 6; city, 13.

Public educational departments: state, 3; county, 1; city, 1.

Other public departments: county, 1.

Private health agencies: national, 6; regional, 2; state, 3; county, 4; city, 23.

College and university, 16.

Insurance, 3.

Railway, 1.

Commercial health education: national, 3; regional, 2; state, 1.

Information not given, 5.

**Two Special "Baby" Editions**—Tabloid supplements were issued by *Rochester Evening Journal*, Dec. 31, 1932 (12 pages), and *Rochester Democrat and Chronicle*, Jan. 2, 1933 (20 pages). Both were published with the coöperation of Monroe County Medical Society and Rochester Tuberculosis and Health Assn. The advertising seems to meet the standards such organizations would set. The text is varied and looks readable. But one article runs as long as two full columns. We wish that another year it could be possible to test the audience by a group of selected volunteers, using the "Gallup method" well known to newspapers as a method in checking reader interest of newspapers. For samples address Rochester (N. Y.)



Tuberculosis and Health Assn. 10 cents.

#### DATES AHEAD

April 23-30, 1933—"Better Homes Week." Address: Better Homes In America, 1653 Pennsylvania Ave., Washington, D. C.

May 1, 1933—May Day and Child Health Day. Address: American Child Health Assn., 450 7th Ave., New York.

June 26-30, 1933, at Toronto, subjects of interest to readers of this department will appear on the program of the National Tuberculosis Association. In the Sociological Section: "The Philosophy of Health Education," by Prof. Ira V. Hiscock; "Authenticity of Health Education Materials," by Dr. W. W. Bauer; "The Tools of the Health Educator," by Dr. Grant Fleming. "Training and Placement of Personnel" in Administrative Section: "Qualifications," by George J. Nelbach; "Training, Recruiting and Staff Education," by Philip P. Jacobs. The National Conference of Tuberculosis Secretaries will consider "Some Essentials of Good Management in a Tuberculosis Association," with 8 sub-topics by as many speakers, this being one of three parts in a single morning session. This will hardly give time for satisfactory discussion and sharing of experiences. Copies of program from National Tuberculosis Assn., 450 7th Ave., New York.

#### DEPRESSION

"Morale: The Mental Hygiene of Unemployment," by G. K. Pratt, M.D. National Committee for Mental Hygiene, 450 7th Ave., New York. 64 p. 25 cents; 10 at 20 cents; 50 at 15 cents; 100 at 10 cents. Unemployment relief workers, social workers, public health nurses, clergymen, educators—all who must look into the anxious faces of the unemployed—will find this an invaluable aid. It seems

possible that many men's clubs, women's clubs, and other groups might find material in the pamphlet for a meeting program. Staff conferences and groups of health and social workers might use the material for discussion."

Valuable material for meeting budget depression efforts is contained in *Health News*, Los Angeles County Tuberculosis and Health Assn., 132 W. 1st St., Los Angeles, Calif. May-June, 1932. "Cost of Preventable Sickness Far More Than Public Health Cost," and "What Price Health?" by Health Officer Pomeroy; and "Public Health Returns Dividends of 600 Per Cent in Eleven Years" could be quoted or adapted. "What Price Health?" pictures some health protection contacts experienced by "Mr. Citizen" in the course of his average day. In a cover-page box is a "Statement—Bank of Public Health in Account With Los Angeles County Taxpayers," with total "Expenditures" and "Savings."

"Mental Relief for the Unemployed," by Troyer and Clapp, tells of an experiment in opening regular college classes to qualified unemployed people of Appleton, Wis. The analysis of the whole experiment suggests the possibility of courses in personal and community hygiene for popular education and "mental relief." We hope that some readers who have been interested in exploring adult group work in health education will give serious attention to this article. In *Journal of Adult Education*, 60 East 42d St., New York. Jan., 1933. 75 cents.

"The Economic Depression and Public Health." *Quarterly Bulletin*, Health Organization, League of Nations, Geneva. Sept., 1932. "Mortality and Morbidity Statistics"; "The Nutrition of the Unemployed"; "Indications of a Reaction of Unemployment on Health"; "Psychological Effects of Unemployment." 50 cents. World

Peace Foundation, 40 Mt. Vernon St., Boston.

"Robbing Tomorrow To Pay for Today." Radio talk given recently for Ohio Public Health Assn., Columbus.

"Unemployment And Health," a radio talk, from Illinois State Dept. of Health, Springfield. *Free*.

#### EDUCATIONAL MATERIAL

The diverse material listed under this or similar headings from month to month includes reference material as background in preparing popular material; other material which may be secured in quantity or be reproduced for local use; as well as some items to be passed on to key individuals or small selected groups.

A single copy, or several copies, may at the right time be just what is wanted for newspaper editorial use.

Other uses with individuals may mean as big a job accomplished as the distribution of hundreds or thousands of leaflets in mass fashion.

"Cosmetic Follies," by H. Goodman. Reprint from *Hygeia*. Dec., 1932. 4 pp. 5 cents. "Common sense becomes uncommonly good sense when it is applied to the use of cosmetics." If anyone sends copies of this to local "woman's page" editors please report if any use of the material follows.

"If I Keep My Health," by Dr. W. W. Bauer. Reprint from *Hygeia*. Dec., 1932. 3 pp. 5 cents. A conversation about the health inventory. Some health officers could make it into a monologue; others could condense it into a dialogue. Try it on Rotary?

"What Price Antivivisection?" by B. H. Moon. Reprint from *Hygeia*. Nov., 1932. 7 pp. 10 cents.

The above reprints from American Medical Assn., 535 North Dearborn St., Chicago. Lower rates for quantities.

"Household Mechanical Refrigeration, With Special Reference to the

Toxicity of the Refrigerants Utilized." A report and an editorial reprinted from *Journal of A.M.A.*, June 7, 1930. Thought to be of timely interest. A. M. A. 6 cents.

Two issues of "The Little Blue Books" came from the Division of Child Welfare, Dept. of Pensions and National Health, Ottawa, Ontario, in 1932. "Maternal Care" and "Infantile Paralysis." "The Little Blue Books," as written by Dr. Helen Macmurchy, may be counted upon for usable ideas as to what to say and how to say it. They are directed to the interested citizen as well as the person directly concerned. Not everyone will wish to use quite as many capital letters, but that is easy to handle. Two earlier issues received recently are: "Rickets: Prevention and Cure"; and "Keep the Family Well: Protection by Prevention." Specify French or English edition.

"Surveys of the Medical Facilities in Three Representative Southern Counties," by O. S. C. Guild, M.D.; "The Ability to Pay for Medical Care," by L. S. Reed. Two of "Abstract Publication" series of Committee on the Costs of Medical Care, 910 17th St., N. W., Washington, D. C. *Free*.

"Shall We Afford Health," by Mary Ross. *Survey Graphic*, 112 East 19th St., New York. March, 1933. 30 cents. "How the dice are loaded against both those who need and those who give medical care" is brought out in this article, based on two of the Costs of Medical Care publications.

"Some Facts About Malaria." Revised edition of a Farmers' Bulletin. Supt. of Documents, Washington, D. C. 5 cents.

"Education." A revision of the catalogue of government publications. Includes in print titles on health, physical, safety, and sex education. Supt. of Documents, Washington, D. C. *Free*.

"Safe At Home." John Hancock Mutual Life Insurance Co., Boston. 14 p. *Free*. One of the most dangerous places in the world is the modern home. This readable booklet tells how to make home safe for child and adult.

"1932 Supplement to Catalogue." National Dairy Council, 111 North Canal St., Chicago. New material and some discontinued material. *Free*.

"A Study of Sickness Cost and Private Medical Practice," by D. B. Armstrong, M.D. Metropolitan Life Insurance Co., New York. *Free*. A paper read before A.M.A., May 13, 1932.

The provision of valuable pamphlets on professional topics, made available by a manufacturer is illustrated by publications from Medical Division, Eastman Kodak Co., Rochester, N. Y.: "X-Rays and Health"; "X-Rays in Dentistry"; "X-Rays in Medicine." *Free*.

#### DIPHTHERIA

Saving Children's Lives is a report of the final luncheon of the Diphtheria Prevention Commission of the Department of Health of New York City, 1932. 52 pp. Includes "The Story of the Campaign," "The Example Set by Diphtheria Prevention," "Diphtheria Prevention as a Financial Gain," etc. Does not look like a governmental report, and the interesting typographical arrangement removes all of the dull appearance so characteristic of mere reports of a meeting.

"Preventing Diphtheria in the United States and the Dominion of Canada" is a "summarization of the way in which diphtheria prevention projects are being carried on in various sections." 15 legal size pages. Statements from 29 cities in 21 states and provinces. This material was collected for distribution at the largely attended luncheon on diphtheria prevention held at the Washington meeting of the A.P.H.A. Both

luncheon and memorandum were due to Mrs. Marie F. Kirwan, State Committee on Tuberculosis and Public Health, State Charities Aid Association, 105 East 22d St., New York. Copies *free*.

A 4-page folder on diphtheria from Bureau of Health, Trenton, N. J., is simply and clearly written. Good use is made of black-face headings which lead direct into the subsequent paragraphs.

#### MOTION PICTURES

A reduction in costs enables the American Social Hygiene Assn., 450 7th Ave., New York, to reduce the price of its 16mm motion pictures. The remainder of 35mm film, inflammable, will be sold at half price.

This description of an amateur picture, from *Movie Makers*, illustrates the possibilities in content and use:

Dr. David Ulmar, in New York City, has completed a 300 foot health film, dramatically showing the necessity for the care of scratches and bruises to prevent infection. The story tells of an accident at a boys' ball game when one of the youngsters, who receives a minor scratch, fails to give it proper care. Later, infection sets in and the injury requires medical attention. This is made the occasion of a brief but effective sequence on the cause and development of infections. The picture was made partly as an object lesson for the boys under medical observation, who took part as actors, and partly as a teaching film for the benefit of other boys' clubs.

"The Production of Animated Diagrams With Amateur Equipment," by R. L. Petry. *Education Screen*, 64 East Lake St., Chicago. Jan., 1933. 25 cents. A simple, practicable method by which an amateur may produce diagrams involving motion; doubtless applicable to production of statistical diagrams.

*Movie Makers*, 105 West 40th St., New York. Feb., 1933. 35 cents. Includes articles for the amateur on inexpensive home built outfit for trick results, expert counsel in film editing, and interesting ideas as to closeups.

A lot of back numbers of *Movie Makers* are being sold at 15 cents a copy. Every issue contains valuable ideas. Ask for list of available numbers.

"16mm Movies on the Mission Field," by N. B. Bercovitz. *Educational Screen*, 64 East Lake St., Chicago. Dec., 1932. 25 cents. How a Korean hospital produced amateur pictures for such eminently practical lessons as giving baby's bath and a mother feeding a baby. The pictures were shown to as many as 2,000 mothers at a time. The picture was shown, then the nurse described what they had seen, then it was shown again with the speed reduced at points where it was desirable to get full detail.

"Where to Buy, Rent, and Borrow 16mm Films—Silent and With Sound." Victor Animatograph Corporation, Davenport, Iowa. 5th Edition. 64 pages. Free. An attempt to list all sources for all subjects. Includes some information about projection, care of film, etc.

#### REPORTING

We don't get to see many annual reports of national health agencies and so can make no comparison, but "1932 in Review," by Jean B. Pinney, offers a remarkable array of presentation, interpretation and promotion activities. In this "Summary of Activities of the American Social Hygiene Association" we note especially the material under "Conferences and Conventions," "Popular Health Instruction," "Social Hygiene in the Schools and Colleges," "Parent-Teacher Associations," "The Women's Clubs," several sub-headings under "Routine Activities." Nearly all executives and health workers could read this to the advantage of their own work. In *Journal of Social Hygiene*, 450 7th Ave., New York. Jan., 1933. 35 cents.

The Middletown, N. Y., Health Officer's report is quite as satisfactory this year as last when it won a certificate of merit from the Social Work Publicity Council. In appearance it is a masterly piece of mimeographing, with its neat right margin quite as even as its left and its good-humored illustrations. We marvel at the facial expressiveness of the tiny figures in the sketches that Mildred Dillistin, the skilful mimeographer, draws on the stencil. The copy is readable and well organized. We do find the title, and what we gather is the sub-title, of the report, "The Useful Citizen of Tomorrow Will Be the Child Who is Being Well Cared for Today" a bit unwieldy, but we predict that the sketch of a baby on the cover will draw all attention from that title.—Hilary Campbell.

What one state department, with fairly adequate funds may do in health education, and the reasons for what it does, is set forth in the Biennial Report, 1929-1931, of Tennessee Department of Public Health, Nashville. The chapter on "Health Education" covers 12 pages, including several diagrams and maps. There are the following sub-headings: "School Health Education," "Health Education for the General Public," "Training of Personnel," "Miscellaneous Activities," "Health Education Activities of County Health Departments." The following paragraphs introduce the chapter:

Activities in Health Education Service have covered a very wide field. From a broad general standpoint it might be said that all activities of a health department are in the nature of health education, but aside from this, there are certain specific procedures in the state's program which come under the classification of health education. Essentially these are health education for the school child, health education for the general public, health education for professional personnel, and miscellaneous services.

The budget for health education proved itself insufficient for the conduct of a reason-

ably adequate program. In order to supplement it, aid was obtained from The Commonwealth Fund, so that in addition to the director there could be employed an associate director for general public health education, a portion of the salary for operator of a motion picture truck, and a fund for printing pamphlets and other health educational material.

#### SCHOOLS AND CHILDREN

Correction: "Safety and Health of the School Child," by J. F. Rogers, was priced at 10 cents in the February *Journal*. Single copies are free; 5 cents each up to 50 copies; 4 cents each in larger lots. U. S. Office of Education, Washington.

Before this paragraph is printed the first issue will appear of *Spyglass*, a quarterly health magazine written for children in the fifth and sixth grades. Address Miss Anne Whitney, American Child Health Association, 450 7th Ave., New York.

In "A Plea for School 'Fads'" Dr. William H. Kilpatrick urges that in retrenching some of the newest ideas may be worth saving. Said Dr. Kilpatrick:

Health instruction is a new thing. Is it a fad? Shall we cut it out? The figures give the answer. Where people learn better how to live and do it, the death rate comes down. The schools have helped people know better what to eat and how to live. We cannot cut out health instruction.

On the school page, *New York Times*. Sunday, Feb. 5, 1933. Doubtless you may find this in your public or university library.

"Camps and Public Schools," by M. M. Ready. Office of Education, Washington, D. C. 9 pp. Free. Information about camps for normal or malnourished children maintained by or in connection with public schools.

"Children's Dentistry in Honolulu" is the 1932 report of Palama Settlement's Dental Clinic for School Children. A special contribution is the data on unit costs of the service. It was clever to print the envelope in the same tone as the postage paid permit stamp.

From Philip S. Pratt, director of Palama Settlement.

"Lists of judged outstanding health and physical education courses for elementary, junior and senior high school grades," are 4 mimeographed pages listing public school courses of study, with date and grades included. Supplied by Teachers College, Columbia University, New York. Useful if one wishes to select from the shelves of the school library. Some of the courses may be available—probably at a price. Send 10 cents for the lists.

"Helpful References on the School Lunch," under "Nutrition Information," by M. B. Bakkie. *Red Cross Courier*, Washington, D. C. Jan., 1933. Sample free. Information sources for rural and city schools.

"High Spots in School Health," by J. F. Rogers, M.D. Reprint from *School Life* 2 pp. Biennial Review, 1930-1932. Address the author, Office of Education, Washington, D. C. Free.

The monthly calendar of special topics covered by *School Health* runs as follows: October—Ventilation and Cold Prevention; November—Nutrition—Teeth; December—Posture and Exercise; January—Health Examinations; February—Sleep, Rest and Eyes; March—Mental Hygiene and Character Education; April—Tuberculosis—Communicable Disease; May—Play Days and May Days. Vacations.—Detroit Tuberculosis and Health Society.

"The Rural Hot Lunch as a Health and Social Activity," by Mary G. McCormick. State Education Department, Albany, N. Y. 19 pp. Free to teachers in New York; 10 cents to others. Dietary hints in addition to "An Activity That Promotes Good Health Habits" and "Health and Social Activities for the Noon Hour."

"What Is Your School Room Temperature?" A blank form for hourly

record for a week; "too hot" and "too cold" indicated; with paragraphs on heat and moisture.

"My Graph of Height, Weight and Growth." Includes weight record spaces for a year.

Both of the above are laid out so that the facts may be emphasized as a graph. Both from Minnesota Public Health Assn., 11 West Summit Ave., St. Paul, Minn. Enclose 3 cents for samples.

#### RURAL WORK

"Improvising Equipment for Home Hygiene Classes," by Alice Adshead. *Red Cross Courier*, Washington, D. C. Jan., 1933. *Sample free.*

"Friend Hectograph," by Gertrude Spaulding, under "Public Health Nursing and Home Hygiene Service." *Red Cross Courier*, Washington, D. C. Jan., 1933. How a rural Red Cross nurse uses the hectograph in duplicating material for reaching 60 teachers in 43 schools in a county. *Sample copy free.*

#### THESE HAVE BEEN BROADCAST

Upon request to the sponsors copies of most of the radio talks listed below will be supplied to health agencies.

American Child Health Assn., 450 7th Ave., New York: "Straight As an Indian," "Out of the Ordinary Children."

Baltimore City Health Department: "The Will to Win" (President Roosevelt), "Your Very Young Child."

Connecticut State Dept. of Health, Hartford: "The Health Inventory," "How Much Do You Spend for Health?" "Safeguarding the Adult Teeth," "Teaching the New Mother to Care for Her Baby," "What Do You Know About Your School Water Supply," "The Work a Health Laboratory Does."

Jefferson County Board of Health, Birmingham, Ala: "Fighting Our

Greatest Enemy" (tuberculosis).

Massachusetts Dept. of Public Health, Boston: "Hemorrhagic Diseases," "Insurance Against Diphtheria," "What Is New in Infant Feeding?" "Cancer," "The Heart," "Your Title to a Job," "Why a Health Department?" "Effects of Fatigue," "Vacation Health," "The Use and Abuse of Serums and Vaccines," "Can We Prevent Diabetes?" "Hobbies and Health."

New Hampshire State Board of Health, Concord: "Child Care—One to Six."

New York State Department of Health, Albany: "Rickets," "Social Hygiene," "Food for Health," "Quarantine and Isolation of Persons Affected With Communicable Disease," "Preventive Dentistry," "Baby Teeth and Their Care" "Shopping for Milk."

State Department of Public Health, Springfield, Ill.: "The Heart, the Arteries and Blood Pressure," "Advantages of Winter Vacations," "New Ways to Combat Rickets," "Public Welfare and Public Health," "Diabetes, a Growing Health Problem," "The Disease Carrier," "Milk and Health."

*Please send in copies of broadcasts not in the form of talks.*

#### CRITICISM

"The most recent atrocity perpetrated by that form of art called the motion picture business is a picture called 'Life Begins,'" says *Journal of A.M.A.*, Chicago. A weird presentation of maternity hospital conditions. See issue for Nov. 19, 1932, for details.

Health and Welfare groups wishing to discuss criticisms and how to handle them may secure an outline for one or two sessions entitled "When We Are Criticized." Send 3 cents to Social Work Publicity Council, 130 East 22d St., New York.

## BOOKS AND REPORTS

**Life Begins at Forty**—By Walter B. Pitkin. New York: McGraw-Hill, 1932. 175 pp. Price, \$1.50.

Modern youth, we are told by this professor of journalism, is in the red. Fools die young. The whole system of education is wrong. Life really begins at the age of forty and everything great is achieved after that time.

Such is the thesis of this little book and it must be admitted that the author argues his case skilfully and at times plausibly, even if his conclusions are based upon somewhat tenuous facts. The physiological and psychological data employed are not always strictly in accord with the latest scientific principles, but a certain latitude in their interpretation is probably allowable.

The book will prove interesting and inspiring to most individuals who have reached or passed the fourth decade of life, but somewhat discouraging to callow youth. The typography is good, the paper not so good, and there is no index.

JAMES A. TOBEY

**Social Hygiene in Schools.** *Report of the Sub-committee on Social Hygiene in Schools of the White House Conference on Child Health and Protection*—William F. Snow, Chairman. New York: Century, 1932. 59 pp. Price, \$.50.

The importance of social hygiene cannot be overstressed in the present unsettled state of affairs. This report from the White House Conference is well conceived and is written with a balance and insight which is highly commendable.

Part I considers briefly, but clearly, the problems, principles, and methods of social hygiene. The primary aim of social hygiene is stated to be "the preservation of the family and the

improvement and enrichment of family life." It "confines itself in the main to the group of personal and social problems which grow out of the mating instinct. . . . The essential task of social hygiene is to harmonize this conflict as far as possible, by directing the individual's sex nature so that it may contribute most richly to his self-development and happiness and at the same time conserve and advance the welfare of society." An excellent statement is given of the established facts and principles of social hygiene.

Part II treats of the functions of homes, schools, and other social agencies in meeting the problems. These are taken up systematically for infancy, childhood, and adolescence. Perhaps the most telling part of this report is that dealing with adolescence. It seems to focus the whole problem.

Parts III and IV sketch in mere outline certain supplementary community activities and indicate lines for further study and research. A carefully selected, working bibliography completes the report. The report should prove useful in the hands of parent-teacher groups, social workers, and educators.

RICHARD A. BOLT

**Community Health Organization**—Edited by Ira V. Hiscock. New York: The Commonwealth Fund, 1932. 261 pp. Price, \$2.50.

This valuable manual of health administration is the result of 12 years' experience on the part of the Committee on Administrative Practice of the American Public Health Association. Professor Hiscock, the editor, in collaboration with the members of the committee, after a critical review of procedures in some 200 American cities, has made available a splendid basic out-

line for the health services of a modern city. What is more, he has given from his store of knowledge much wise comment on problems of organization and coördination of official, professional, institutional, and voluntary health agencies. An abundance of quotations and footnote references add greatly to the usefulness of the volume.

All the usual public health services are described. The text follows rather closely the standards established in the *Appraisal Form for City Health Work*. These standards are now widely accepted. Some may question such items as the quota set for communicable disease hospital bed capacity or the inference that mass efforts to Schick test children after diphtheria prevention are warranted. The volume, on the other hand, affords excellent guidance in the puzzling problems of school hygiene and city housekeeping or environmental sanitation. Industrial and mental hygiene are also considered among the newer aspects of community health administration.

In a courageous way an attempt is made to indicate necessary budget appropriations for the various essential health activities. This courage is reflected in the closing sentence of the volume: "... every dollar spent along the lines laid down will bring ample returns in the strengthening of the vital force and the economic resources of the community."

It is true that during the golden decade ending in 1929 official health budgets were gradually increasing. At present attention is being focused on the question of quality as well as of quantity of health service rendered for the dollar expended. It is being asked in health as in education whether or not government may be doing for the people many things that it should do for itself. Present economic conditions render the whole problem doubly vexatious. There is often a heavy tax burden which

brings a reduced civic budget, while simultaneously large groups are no longer able to finance their own health protection as they did formerly. In general it is believed, however, that health appropriations have never been excessive.

Community Health Organization has already begun to serve as a valuable instrument in the hands of official and voluntary health workers. There are many who will welcome the assistance of Professor Hiscock and the committee as rendered in the volume under consideration. HUNTINGTON WILLIAMS

**Outwitting Our Nerves**—By Josephine A. Jackson and Helen M. Salisbury. 2nd ed. New York: Century, 1932. 417 pp. Price, \$2.50.

This book was originally published in 1921 and has since been a best seller. A quantity of new interesting material has been added, and the work as it now stands is probably one of the best things of its kind ever presented to the lay reader. It fearlessly raises the standard of sane and scientific hygiene against the cranks and faddists who occupy the half-world surrounding the general medical field. The authors dwell much upon the power of unconscious autosuggestion which is seen governing the public mind in many more ways than is generally realized. They show conclusively that the advertising pages of popular magazines and newspapers, the notices in street cars and subways, and, above all, the tempting counters of the drug store, present a continuous series of ill-health suggestions in one form or another, and the ills that follow from them, being of a purely psychological character, do not yield to ordinary medical treatment, and are to be overcome by freeing the victim from the false suggestion.

Many popular bogeys receive their death-blow in these pages. "That tired feeling" is shown to be largely a



matter of habit and autosuggestion. Here they quote William James at his best with great effect. The current nonsense about internal baths with expensive apparatus is thoroughly exposed, and the popular specter of constipation put where it belongs. The reader is shown in the most convincing way that these functions are, except in certain rare cases, just a matter of mental habit. In fact, the doctrine of mind over matter is the leitmotiv of the book.

Regular habits, a cheerful tone of mind, moderation in all things—these are the principles inculcated. The plea for an all round, well balanced diet as opposed to the counting-the-calories craze is very timely and encouraging.

The new psychology is not overlooked, and, without riding the complex horse to death, or championing either Freud or Jung, they state the general position and the obvious morals to be drawn from it, with characteristically balanced judgment and breadth of outlook.

No better book could be imagined for medical practitioners to place in the hands of any patient. It is brightly written, and completely fool-proof. *Outwitting our Nerves* is worth every cent of the \$2.50 charged for it, but from the point of view of public interest we look forward to the time when it can be placed within general reach at \$1.00.

EMMET FOX

#### The Sciences of Man in the Making:

An Orientation Book—By Edwin A. Kirkpatrick. New York: Harcourt, Brace, 1932. 386 pp. Price, \$4.00.

This book is intended to give the average educated reader a preliminary orientation into the various sciences dealing with man. It starts out with a discussion of the nature and methods of science and considers under fifteen different chapters such subjects as: Evolution, Anthropology, Physiology, Eu-

genics, Economics, Political Science, Psychology, Education, Religion, Morals, and Ethics.

The book is written in a very clear, non-technical manner. The facts as presented seem to be logically grouped and presented. The attempt to cover such a wide range of subjects obviously means that comparatively little material is presented for any single subject.

An interesting addition to the book is a series of selected researches which appear at the end of each chapter, and which either quote directly or summarize an important piece of research pertaining to the material discussed under that chapter. These seem to be quite well chosen and presented.

There is a list of suggested reading at the end of each chapter to encourage further study of the subject.

On the whole the book appears to fulfil in a satisfactory manner the function for which it was written, and be recommended for that purpose.

KARL M. BOWMAN

#### Housing and the Community—

Home Repair and Remodeling—*Reports of the Committees on Housing and the Community; and Reconditioning, Remodeling and Modernizing, The President's Conference on Home Building and Home Ownership, Washington, D. C., 1932.* 291 pp. Price, \$1.15.

This volume from the President's Conference on Home Building and Home Ownership is divided into two major portions, namely, housing in the community, and home repair and remodeling. The section on housing in the community discusses such important matters as the relation between housing and health, delinquency, safety, citizenship, recreation, and education. The report is closed with recommendations to the effect that city planning and zoning boards should bend every effort to eliminate blighted areas in the cities

and towns of the United States; that planning commissions should lay out definite master plans for inhabited areas; that secondary blighted areas be reconditioned to prevent further development of slums; that a model act be formulated to serve as a basis for legislation making possible the assembly of land tracts in sufficient size to permit neighborhood community development; that instruction in the essentials of good housing be given in the school system; and that consideration be given in housing plans to such factors as beauty of land layout and recreational facilities.

The second section of the report discusses in much detail the reconditioning, repair and remodeling of the home. Certain recommendations are also given, one of the most important of which suggests that an organization be established qualified to carry out the findings of this committee. In the appendix to this report there is a home inspection check-list which seems to cover every item of the home to which one's attention should be given when considering repairs or remodeling.

ARTHUR P. MILLER

**Your Teeth and Their Care:** *A simple explanation of dentistry, dental procedures, and the relation of the dentist to the public*—By Carl W. Adams, D.D.S. St. Louis: Mosby, 1932. 141 pp. Price, \$1.25.

This helpful little book is the outgrowth of a number of questions which have come to a busy dentist. ~~over a number of years~~ <sup>over a number of years</sup> It presents in concise form the answers to questions concerning the structure and function of the teeth, their irregularities, diseases, and treatment. A considerable portion of the book is devoted to oral prophylaxis and the relation of diet to oral health. The chapter on diet has drawn largely from the work of McCollum and Simmonds and from Dr. W. D. Sansum's *Normal Diet*. Dr. Adams takes the

reader into his confidence in the various procedures incidental to dental practice.

In closing this treatise I venture to hope that what I have written will impress upon the reader the importance of preventive dentistry, the aims of which may be summed up as follows: First, to make it possible for every child to be well born, in other words to have a normal set of teeth. Second, to preserve them in health by prescribing a healthful diet. Third, to instruct people how to keep their mouths and teeth clean. Fourth, to impress upon the public the necessity for availing themselves of dental services at regular intervals.

RICHARD A. BOLT

**Health Education Activities**—By Kathleen Wilkinson Wooten. New York: National Tuberculosis Association, 1932. 288 pp. Price, \$0.75.

This really useful book is planned to meet the needs of pupils of different age and experience levels, namely primary, intermediate, and high school, the latter including both the junior and senior. Each section is preceded by a brief introduction which discusses the general characteristics and interests of the age group and gives definite references for further reading.

The succeeding pages are devoted to suggested activities, the first and most important of which are the surveys for determining health assets and indicating health needs, both for the school environment and the individual pupils. Two sets of survey questions appear in the appendix, and one might regret that the body of the text did not treat in more detail this excellent method of approach to school health problems. Fortunately it does gain emphasis by having the brief paragraph repeated in connection with the activities for each grade and by suggesting the desirability of having older pupils participate in making such surveys.

The second suggested activity, daily health inspection, is also repeated for each grade and early in the primary section introduces the important prob-

lems of individual pupil responsibility and communicable disease control.

The bulk of the volume is devoted to suggested activities and stories which might be helpful to the teacher in establishing desirable health interests or attitudes and in encouraging satisfactory health practices. When the latter concern home practices such as sleep one wishes that it might be possible to guard against the tragedies that sometimes occur because of lack of sympathetic understanding of pupil problems.

For the most part the primary and intermediate materials are carefully graded and interesting, though some of us may doubt the value of home nursing in grade IV, and some of us may be convinced that the very obvious morals of some of the health stories will result in fiendish glee rather than interest in desirable conformity.

The unit of activities for the high school health program is not a result of the author's experience but it represents what has been done successfully in a number of high schools throughout the country and should be a valuable reference for all high school administrators and teachers who are, or wish to be, convinced that even the teen age can recognize the importance of health for happy and successful living.

MARY L. HAHN

#### Cultivating the Child's Appetite—

*By Charles Anderson Aldrich, M.D.*  
2d ed. New York: Macmillan,  
1932. 137 pp. Price, \$1.25.

Modern parents have accepted whole-heartedly the idea that their child must eat certain foods and certain quantities thereof to be healthy. They make necessary sacrifices to secure the right kinds of foods, and study assiduously the advice of nutrition experts; but many of them strike a rock when they face the will of the child whom they are trying to feed. The complaint that,

"I cannot make my child eat what he should," is common.

To such parents Dr. Aldrich's book will be a real boon. It presents in simple form the principles which control appetite, but will perhaps be more highly regarded by the parents for the sympathetic way in which he discusses their problems in controlling the psychology of the child. There is probably no single set of directions that will ever answer the question of how to make any child eat what it should, but Dr. Aldrich has gone far in providing helpful suggestions in the solution of this problem.

W. H. EDDY

#### Reports, National Quarantine Service. Series II—1931—*By Wu Lien-Teh and Wu Chang-Yao.*

This publication reviews quarantine practice in China before the National Quarantine Service took over the control of port health work at Shanghai from the Chinese Maritime Customs on July 1, 1930, and gives a complete history of the development of the National Quarantine Service since that date.

The history of modern quarantine practice in China dates back to the year 1873 when measures were taken at Shanghai and Amoy against the threatening invasion of cholera from Siam and the Malay Peninsula. The initiative at Shanghai with regard to quarantine was taken by the Commissioner of Customs and in 1874 the first comprehensive quarantine rules ever adopted in China were issued. These rules were approved also by the Treaty Power Consuls. These were followed from time to time by the adoption of similar rules at other Chinese ports. These regulations, however, were difficult of enforcement, principally because of lack of the necessary quarantine facilities for this purpose.

By an arrangement with the Ministry of Finance, which controls the Customs,

the port health work at Shanghai was taken over on July 1, 1930, and put under the authority of the Ministry of Health, acting through its National Quarantine Service. Since that date several other ports, i.e., Newchwang, Amoy, Swatow, Antung, and Hankow have come under the control of the National Quarantine Service.

Preparatory to the transfer of the port health work from the administrative jurisdiction of the Customs Administration to the National Quarantine Service, an extended tour of instruction was made by various officers of the National Quarantine Service. This tour was undertaken with the object of studying the latest developments in port sanitation and allied subjects in the principal ports of Europe, United States, and Asia and was conducted under the joint auspices of the Health Section of the League of Nations and the Nationalist Government of China.

Benefiting by the knowledge gained on these tours, the National Quarantine Service adopted the new quarantine regulations recommended by Dr. C. L. Park, Director of the Australian Quarantine Service and Chief of the Epidemiological Division of the Health Section of the League of Nations, who made a survey of the quarantine needs at Chinese ports under the auspices of the League of Nations, which included the most modern quarantine practices and were promulgated in English as well as in Chinese text.

With the object of increasing the efficiency of the Service, the headquarters of the National Quarantine Service at Shanghai has been organized into four main divisions: Administrative, Boarding, Fumigation, and Medical Service, under division heads which were in turn responsible to the Director. A special department of investigation and research was instituted in December, 1930, and under its direction a rat and flea survey of the port

of Shanghai, and laboratory research in the cholera problem are being carried out.

Detailed reports of the various divisions for the year 1931 are contained in this publication and much other valuable information is gleaned therefrom with respect to recently instituted quarantine practices and improvements at the various ports in China.

That an improvement in the quarantine service of China has been made is suggested by the control and early suppression of the cholera epidemic which broke out in Shanghai in the summer of 1931 when 482 cases with 57 deaths were reported and which was suppressed in 76 days from the discovery of the first case.

F. A. CARMELIA

*The History of Dermatology—By William Allen Pusey, M.D. Springfield, Ill.: Charles C. Thomas, 1933. Price, \$3.00.*

The author states in his preface that there is no history of dermatology in English, and has undertaken to supply this need. Everyone knows that there is no one better fitted to write such a book than Dr. Pusey. Not only does he know his subject, but he knows how to write in an interesting and orderly manner.

The book begins with ancient dermatology, Egypt to Greece, 3000 to 300 B.C. It brings us down through Graeco-Roman, Arabian and medieval dermatology, Rome to the Renaissance, 300 B.C. to 1500 A.D., and so on to the present. Dermatology began to find itself, so to speak, 1750 to 1825, clinical and laboratory dermatology 1800 to 1850. The first phase of modern dermatology in Continental Europe and in Great Britain and the United States is placed from 1850 to 1900.

The author, while giving full credit to those anatomists who studied the

skin, the sweat glands, etc., gives to Astruc credit as the true founder of modern dermatology. British dermatology is credited chiefly to Willan (1757-1812), but it is recognized that the founder of French dermatology, Lorry, of Paris, was the first to regard the skin as a living organ of the body with relationships to all other parts. The efforts of Lorry and Willan therefore combined to start the modern stream of dermatology.

Most interesting sketches are given of many of the great dermatologists. The first dermatological society in the world was founded in New York in 1869, and has had a continuous existence to the present. Dermatology in America derived its inspiration from Europe, and James C. White, a disciple of Hebra, is described as being the strongest force in shaping its early course. The author states that spirotrichosis and tularemia are the two diseases which have been discovered and completely worked out in the United States.

A very useful part of the book is a historical index of dermatology, written largely by Dr. Herbert Rattner. The text is well illustrated with photographs of the majority of the men who have been prominent in this line. A good index adds greatly to the value of the book. The printing and make-up are characteristic of the fine work to which we have been accustomed from Charles C. Thomas. MAZŮCK P. RAVENEL

**The Diagnosis and Treatment of Postural Defects—By Winthrop Morgan Phelps, M.D., and Robert J. H. Kiphuth. Springfield, Ill.: Charles C. Thomas, 1932. Price, \$4.00.**

This book should be a valuable addition to the library of any one having any connection with posture work. It should be of particular interest to the school or public health physician and

nurse because of the concise explanations of normal and abnormal positions and subsequent suggestions for treatment.

The book is generously illustrated with photographs and diagrams, with accompanying short, excellently worded explanations. The exercises are especially valuable, since no extra or expensive equipment is necessary. Several of them, which are new to the reviewer, appear to be of real value. The language used throughout the entire book is so simple and well chosen that nurses and physiotherapists who have read it readily appreciate the problems presented, and undertake their correction with a much clearer conception than they had previously.

The work is open to criticism because of the brevity of the first part, dealing with the causes of poor posture, but since it is not intended as an exhaustive treatise on this subject, this adverse criticism cannot be severe.

The make-up and printing are excellent and the reviewer can recommend it for the purposes for which it was intended. WILLIAM J. STEWART

**Manual of Microbiology—By Walter L. Obold, M.S., and Margaret M. Diehm, Ph.D. Philadelphia: Davis, 1932. 140 pp. Price, \$1.25.**

This book is an attempt to present in a very elementary manner a combination of laboratory guide and textbook. While it is primarily a laboratory manual, much material is given which rightfully belongs only in a textbook. This attempt to combine the two is not commendable, since the laboratory manual suffers from the inclusion of textbook material and the subject matter given is not sufficient for a textbook.

Some inaccuracies are noted: The definition of the word "antiseptic" on page 100 gives only the inhibitory meaning. "Phenol coefficient" is

described as a comparison of "the germicidal property of an unknown disinfectant with a standard 5 per cent phenol solution," whereas a phenol coefficient is a figure which represents a comparison of the germicidal efficiency of a germicide with *pure phenol* against a specific organism.

On page 101 it is stated that "*Staphylococcus aureus* should survive a 1 to 70 dilution of 5 per cent phenol for 10 minutes . . .," whereas the statement should read "*Staphylococcus aureus* should survive a 1 to 70 dilution of pure phenol for 15 minutes. . . ." A model table showing the supposed resistance of *Staph. aureus* to phenol is given on page 101 in which it is shown that a 1 to 70 dilution of 5 per cent phenol (which is actually a 1 to 1,400 dilution of pure phenol) does kill in 10 minutes, whereas the statement above indicated that it must not kill in 10 minutes. Such inaccuracies and inconsistencies are deplorable.

The question arises as to where such an elementary manual could be used. It would not find a place in any professional school.

GEORGE F. REDDISH

Public Health and the Private Medical Practitioner — *Compiled by J. L. Pomeroy, M.D., Los Angeles County Health Officer, 1932.*

This document of more than 300 sheets of mimeographed pages, consists of a series of letters, reports and other data related to the operation of the Los Angeles County Health Centers and their relation to the medical practitioners of that county. As a record of successful operation over a period of years, not altogether connected but indicative of the mass of difficult problems that any health center is bound to encounter in its medical relations, this is one of the most human documents that has come to our notice.

While we wish that Dr. Pomeroy had taken all this material and boiled it down into a concise but comprehensive summary of 60 or 80 printed pages, there is much to say in favor of this unique compilation of data, since he gives not merely the impressions of one man as to what a health center might or might not be, but presents also a series of documents to support his impressions.

A few quotations from various parts of the volume are pertinent in giving some of the salient features of the entire report. The following paragraph gives a good definition of the health center program.

The health center program, as applied in Los Angeles County, is based upon an action by the Board of Supervisors of the County of Los Angeles, whereby they have set up a Medical Advisory Board to act with the Health Officer of Los Angeles County in the administration of health centers in various localities of Los Angeles County with a population of approximately 100,000, the cost of these health centers to be borne both by the community in which they are placed and by the County of Los Angeles. The cost to the community is usually covered by a contract between the city and the Board of Supervisors of Los Angeles County. A constitution and by-laws has been prepared which details the purpose, the membership, the organization, the duties of the staff, the meetings of the staff, the recommendations of each individual health center. These are known as a constitution and by-laws of the medical staff of the particular district health center. This constitution and by-laws can be amended by a two-thirds vote of the attending staff, provided that the said amendment shall first be submitted in writing to the Medical Advisory Board of the Los Angeles County Health Department.

The Health Centers in Los Angeles County naturally encountered a number of difficulties and criticisms which are summed up in one of the reports.

These various criticisms are carefully discussed. Because of lack of facilities, particularly in emergency social work, the health centers were found to be treating cases that might

well be cared for by private physicians. Nevertheless, while not entirely approving some of the procedures of the health centers, the committee was of the opinion that it was the duty of the medical organizations and the private practitioners of medicine to support these health centers.

Another quotation giving an unusually fine statement of the relationship of a private practitioner of medicine to public health in general is:

It is the duty of every physician, whether he be public health officer or whether he be a private practitioner, to stand back of and uphold public health principles in our communities. Public health is a product of the private practitioner, and it is necessary that its tenets be upheld by the private practitioner.

After going through these pages, one gets the impression that while the health centers and the department of health have been criticised, on the whole, organized medicine in Los Angeles County is decidedly favorable to public health work.

PHILIP P. JACOBS

**Benzol (Benzene) Poisoning.** *A new investigation of the toxicity of Benzene and Benzene impurities—By Carey P. McCord in collaboration with Nora Cox and Charlotte O'Boyle. The Industrial Health Conservancy Laboratories, Cincinnati, Ohio. 2d ed. 1932.*

The purpose of the present volume is twofold: to present certain newer evidence concerning the toxicity of highly purified benzol and of certain of the impurities found in commercial benzol, and to provide the medical practitioner with a review of the present-day knowledge of benzene poisoning.

In the studies on various grades of benzenes, absorption of these substances was brought about by inhalation, the test animals being guinea pigs and rabbits. The concentrations used

were 500 and 1,000 p.p.m. of air, usually for a period of 7 hours daily. These studies disclosed all of the various types of benzol to be capable of producing poisoning in the test animals.

Studies on skin absorption of benzol were conducted on 10 rabbits. The smallest dose, applied to the clipped skin of the trunk was 4.2 c.c. daily, while the largest dose was 15 c.c. three times daily. All of the 10 animals died within 11 days. Damage of the skin brought about by the wrappings used to apply the benzol and the benzol itself undoubtedly influenced the nature of the final picture for "at times extensive sloughing took place." The author concludes that "benzol in contact with the skin, in addition to causing a dermatitis or kindred skin lesion, is capable of producing systemic poisoning."

The studies of the toxicity of the impurities of benzene were confined to a study, by inhalation, of acetonitrile, thiophene, amylene, methyl disulphide and carbon bisulphide. Again rabbits were used as the test animal and the substances, as before, were administered by inhalation. These studies according to the author do "not provide any evidence tending to place the burden of benzene toxicity upon its impurities."

The second objective of this study, namely the provision of an adequate review of the subject of benzene poisoning for the guidance of the medical practitioner, is certainly very well achieved. The symptomatology of benzene poisoning, the medico legal aspects of the disease, its treatment and the protection against benzene are well presented. Certainly those persons interested in the medical aspects of this subject will find this portion of the monograph of value. The volume is replete with references to the literature and the terminal bibliography is a reference source of real value in this field.

LEONARD GREENBURG

**Ethics in Nursing**—By Gene Harrison, St. Louis: Mosby, 154 pp. Price, \$1.50.

The author states that this volume on ethics is meant for the modern nurse who does her own thinking in a nursing school where the old militaristic type of etiquette is no longer in vogue. Yet somehow the author's tone gives one the impression that she trained and taught and had most of her experience in a militaristic type of school. There are too many must's and should's, too much formality.

There is a general introduction with many explanations more or less concrete of what ethics is, how it developed and the like. Part I is for the undergraduate, and here one whole chapter is given over to choice of a vocation and of a nursing school, which presumably the nurse has already made and no longer needs.

The second part of the book is for graduates. Here it is a little hard to see why the description of lines of work a nurse may choose after graduation has to do with ethics which is concerned with right and wrong.

The author has stated in clear form the organizations a nurse should belong to when she graduates. Most young graduates are in a muddle as to the difference between belonging to alumnae associations and the district, state, and American Nurses' Association. Many of them think it costs money to enroll in the Red Cross Nursing Service.

Most of the ethical problems of a nurse are dealt with in this book, but one of the greatest ethical problems a nurse has seems to be conspicuously absent—that of her relation to the physician. The word doctor appears but once in the book and that only incidentally. Perhaps ethics in nursing does not include the doctor, but it seems to me the patient may as well be left out as the physician. The public health nurse, for instance, often finds

her medical ethics problems very difficult because she has the patients of not only all the physicians in the community but of every quack as well. Something could be said about the loyalty of private duty and institutional nurses both in word and deed to individual physicians or medical staff.

There are new ideas in the book, and the style is vigorous and individual, but in my opinion better books on ethics for nurses are already on the market.

EVA F. MACDOUGALL

**Slums, Large-Scale Housing and Decentralization.** *Reports of the Committees on Blighted Areas and Slums, Large-Scale Operations, Business and Housing, Industrial Decentralization and Housing. The President's Conference on Home Building and Home Ownership. Washington, D. C., 1932. Edited by John M. Gries and James Ford.* 245 pp. Price, \$1.15.

It is generally believed that because of their lack of financial resources poor people must live in slums and blighted districts. For some time, however, a group of able minds has been at work on the housing problem for persons of limited means. The present volume presents the results of the deliberations of four sub-committees of President Hoover's Conference on Home Building and House Ownership dealing with this very problem.

The obstacles to slum clearance are many—in fact too many to discuss in detail here. Many of these are of relatively little importance. Two of the greatest obstacles are the lack of legal authority required for slum clearance and the problem of adequate financing arrangements. Both of these important parts of the problem are discussed in a most satisfactory manner in the committee reports. The plan for slum clearance submitted by Mr. Veiller is a model for practical use and alone is



a valuable document on the housing problem. Other portions of the volume deal with large-scale operations, business and housing, and a most valuable discussion of industrial decentralization and housing is presented.

A plea is made for a more widespread application of the new viewpoint in the housing field, the viewpoint of industrial large scale fabrication and assembly. It is interesting to note that this aspect of the problem is receiving the attention of the industrialists. At the forthcoming Chicago exposition such factory-made homes will be on exhibit. Perhaps the present depression is laying the groundwork for the remedy of one of the old social evils.

LEONARD GREENBURG

### Principles of Mental Development.

*A Textbook in Educational Psychology—By Raymond Holder Wheeler and Francis Theodore Perkins. New York: Crowell, 1932. 529 pp. Price, \$3.75.*

This textbook has been written with the purpose of placing the prospective teacher in such a position that the varied problems in the schoolroom and in that part of the community represented in that room may be met in an intelligent and a helpful, guiding spirit.

The teacher can no longer approach his work with an idea of pouring out profusely the store of knowledge and information in his possession irrespective of the needs of the individual pupil.

This book has placed in a readable, intelligible, and helpful manner the recent advances in those subjects bearing upon the education of the child of today. It covers in one volume a vast store of knowledge and practical information which should prove a blessing to the teacher and the one taught.

Each child is entitled to gather the necessary amount of book learning, but far above that is his right to be taught the art of living, and the value of self-

adjustment to his environment. The child should emerge from the educational system as a personality that has acquired a necessary amount of information for present needs—how and where to secure additional information—how properly to assimilate and apply it to his problems. He should have a sound mind in a sound body ready to be of service to himself and to his community.

The authors of this book have recognized three great factors in the educational process and stress these occasionally so that they may not be lost sight of in the great mass of material on this subject. These are:

First—What are the problems always faced by the teacher, as a personality, if adequate instruction is to be given at all times?

Second—How adequate in the light of educational psychology are the various methods of instruction and the machinery of the school system?

Third—What are the merits of educational psychology, itself, as a set of principles by means of which to determine educational machinery, methods, and an understanding of the child?

This text is a step in the right direction and cannot fail to assist the conscientious prospective teacher (as well as the one in the work) to see the work in a new light—a wealth of material is placed at his disposal and should help make him a helpful and an inspiring personality in the great work of preparing human beings for successful living—that great field where each must face life, understand life, and live it.

CHARLES HAMMOND

*New Jersey's Agricultural Experiment Station—1880-1930—By C. R. Woodward and E. N. Waller. New Jersey Agricultural Experiment Station, New Brunswick, N. J., 1932. 645 pp. Price, \$2.50.*

This volume is necessarily both a history of the development of the Agricultural Experiment Station and a

review of its accomplishments since its inception. The first chapters are devoted to a review of agriculture and agricultural economics in New Jersey, the establishment and the later development of the teaching of agriculture, including the founding of the Experiment Station. Subsequent chapters deal with the subjects taught or in which research was undertaken. Of these latter investigations, the history of the work on the study of the oyster is of most interest to public health workers, much necessary information about this mollusk being obtained by Dr. Julius Nelson and his successors. Resulting from studies undertaken by this station, the present system of mosquito control in New Jersey, particularly of the salt-marsh species, has developed. The station's contributions to dairy husbandry have been noteworthy. Since 1925 research in agricultural biochemistry has added to the knowledge of nutrition, vitamins, diet influences, and so on.

Perhaps the work of most interest to the sanitary and public health engineers is the work carried on by Dr. Willem Rudolfs and his associates, a brief review of the work and facilities available for these studies being given. As pointed out in the beginning, this book is a review of accomplishments. Details are not given, but valuable references are appended.

VINCENT B. LAMOUREUX

**Our Wonderland of Bureaucracy—**  
*By James M. Beck, LL.D., Litt.D.*  
*New York: Macmillan, 1932. 272 pp. Price, \$3.00.*

In this well written, well printed, and interesting book a former Solicitor General of the United States, now a member of Congress, endeavors to trace the mushroom growth of the many federal bureaus and departments. He quotes with approval an analogy between the typical government bureau and the

protozoa. Both start from humble beginnings but multiply with great rapidity while acting as parasites.

In view of the effective, efficient, and valuable services performed by many of these bureaus, such as for instance, the U. S. Public Health Service, this comparison would seem to be somewhat exaggerated. There is no doubt that the structure of the federal government is top-heavy and unwieldy, and urgently in need of reorganization along more effective lines, but Mr. Beck's indictment of it is at times a trifle overdrawn. To him, for example, the Children's Bureau is anathema, which may or may not be a justifiable attitude.

A book such as this, even if rather hyperbolic, is stimulating reading and should prove of interest and value to sanitarians, most of whom are deeply involved in bureaucracy, usually as participants in this alleged wonderland.

JAMES A. TOBEY

**The Fundamentals of Personal Hygiene—**  
*By Walter W. Kreuger.*  
*Philadelphia: Saunders, 1932. 291 pp. Price, \$1.75.*

This comparatively brief work is designed as a text in personal hygiene, covering the usual list of topics, such as posture, physical activity, health of the skin, ventilation, nutrition, mental hygiene, and so on.

At the end of each chapter are placed a list of health practices to be acquired, a list of questions for class discussion, and a selected bibliography. This arrangement is to be commended. It seems particularly desirable to have a selected bibliography relating largely to the topics just discussed placed at the end of each section or chapter.

The attempt at brevity results in a somewhat unfortunate situation. In some cases, there seems to be a lack of adequate discussion of basic principles. Too rarely are reasons given for statements made. At the ages for which

this text apparently is designed, reasons must be given if true interest is to be aroused.

The short sentence construction makes the text tiring reading. Interest, therefore, is sustained with difficulty.

In the field of efforts toward establishing healthful living, the present concept tends very definitely toward four things: First, enough basic scientific material so that pupils may understand the reasons for warnings or recommendations; second, a vocabulary that compels students to acquire some knowledge of modern scientific terms; third, a type of statement that will arouse thought and interest; and fourth, a flowing style of discourse that will sustain interest.

The lack of scientific background in the text, the over-simplification of vocabulary, and the short sentences which merely state facts—but rarely give explanations—seem to the reviewer to have produced a text that does not meet the standards set in the preceding paragraph.

CHARLES H. KEENE

**Water Analysis for Sanitary and Technical Purposes**—By *Herbert B. Stocks*. *Revised and enlarged by W. Gordon Carey*. 2d ed. Philadelphia: Lippincott, 1932. Price, \$3.50.

The original work, published in 1912, described chemical methods of water analyses then in use.

The author has attempted to bring the present edition up to date by the inclusion of a 10-page section on the bacteriological analysis of water. Obviously, in a book of 129 pages of text, this means that the chemical analysis

is stressed almost to the exclusion of bacteriological methods, which are everywhere recognized as being of major importance in the sanitary analysis of water. Methods for the qualitative and quantitative determination of various elements and compounds found in water are given. Eight appendices deal with standards of purity of water, composition of different types of water, aqueous vapor tension, and the preparation of chemical reagents and some bacteriological media.

The printing and make-up are excellent.

NEWELL R. ZIEGLER

**Your Teeth: Their Care and Preservation**—By *Lewis H. Urling, D.D.S.* Philadelphia: Dorrance, 1932. 67 pp. Price, \$1.50.

Here is another practical handbook written in an easy style for the prospective mother and others interested in mouth hygiene. The author begins logically with the care of the expectant mother and stresses the fact that teeth are formed early during pregnancy. Especial attention is given to diet, including a number of well chosen dietaries. A brief discussion is given of each of the vitamins with their reaction to tooth building. Only a small part of the book is taken up with diseases and abnormal conditions of the teeth and gums. The last chapter consists of a series of "Do's and Don't's About Your Teeth."

"In accepting the author's attempt to present recently discovered knowledge that may be helpful, remember that the desire is only to build upon and not to destroy proven knowledge that has gone before."

RICHARD A. BOLT

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Medicine for the Next Generation**—This contribution is notable for the coinage of "public medicine" (I assume it is original with the author though he doesn't claim it), but it contains many speculations of interest to the sanitarian.

BAKETEL, H. S. The Practice of Medicine in 1950. New York State J. Med. 33, 3:154 (Feb. 1), 1933.

**Typhoid Fever in Germany**—National boundaries are unknown to water-borne typhoid. This report of experience in Germany parallels ours in the United States.

BRUNS, H. Typhoid Fever Epidemics from Water Supply in Germany. J. Am. W. W. Assn. 25, 1:1 (Jan.), 1933.

**Calmette Continues the Argument**—As an example of potent pleading, this paper is worth perusal regardless of the merit of its contentions. With more than a million children vaccinated with BCG to testify to its harmlessness, and with continued laboratory studies in every country to test its stability, the author insists that no one has ever really succeeded in rendering BCG virulent, despite the continuing out-pourings of the Doubting Thomases.

CALMETTE, A. The Fixity of the Attenuation of BCG. Am. Rev. Tuberc. 27, 1:1 (Jan.), 1933.

**Meeting the Doctor More than Half Way**—"The rapid development of public health and its spectacular achievements have created a public demand which the profession of medicine has not yet met," says our Secretary. Public health administration feels this need and urges the practitioner to enter into partnership with "official colleagues in matters calling for ad-

ministrative and engineering skills to which he has not been especially trained."

EMERSON, K. The Practicing Physician and Public Health. South. M. J. 26, 1:31 (Jan.), 1933.

**Air for Solons**—This description of the system of ventilation for the Senate and Congress halls serves two purposes: it will give aid to the serious student of sanitation and comfort to the humorously inclined.

GREENBURG, L. and BLOOMFIELD, J. J. The New Ventilation Systems of the Senate and House Chambers of the Capitol, Washington, D. C. Pub. Health Rep. 48, 6:137 (Feb. 10), 1933.

**For the Beam in Our Own Eyes**—At any meeting of health workers, a casual survey will indicate the great need that sanitarians themselves have for the information contained in this excellent article on the care of the hair. Its lessons should be broadcast from the housetops, too.

HAZEN, H. H. and BIASE, F. The Care of the Hair. Am. J. Nurs. 33, 2:123 (Feb.), 1933.

**Making Swimming Pools Safe for Swimming**—"Since intestinal diseases are spread through the use of swimming pools, only very rarely, if at all, some index of the sanitary quality of the water other than *B. coli* should be employed," conclude these authors who recommend other laboratory checks.

HORWOOD, M. P. *et al.* Indices of the Sanitary Quality of Swimming Pool Water. J. Am. W. W. Assn. 25, 1:124 (Jan.), 1933.

**Progress Report in (Mass.) Tuberculosis Prevention**—Eight years' experience in the Massachusetts 10-year program indicates a 25 per cent infection with a distinct 'downward trend. The possibilities in the preven-

tion of childhood tuberculosis are set forth.

LORD, F. T. *The Prevention and Control of Tuberculosis in the Commonwealth of Massachusetts, With Special Reference to Childhood Tuberculosis and the Ten-Year Program.* New Eng. J. Med. 208, 5:248 (Feb. 2), 1933.

**What Anti-Vaccinists Do Not Cry For**—States with compulsory vaccination laws had 6 cases of small-

pox per 100,000, whereas states where compulsory vaccination is prohibited enjoyed a rate of 115. The states are mapped and listed according to rates with Massachusetts first with 1 per 100,000 and Utah last with 272. Will the computation bother the anti-vaccinist? Not at all!

WOODWARD, S. B. and FEEMSTER, R. F. *The Relation of Smallpox Morbidity to Vaccination Laws.* New Eng. J. Med. 208, 6:317 (Feb. 9), 1933.

## BOOKS RECEIVED

**TUBERCULOUS DISEASE IN CHILDREN: ITS PATHOLOGY AND BACTERIOLOGY.** By John W. S. Blacklock. London: His Majesty's Stationery Office, 1932. 155 pp. Price, \$1.00.

**THE TIDES OF LIFE.** *The Endocrine Glands in Bodily Adjustment.* By R. G. Hoskins. New York: Norton, 1933. 352 pp. Price, \$3.50.

**CRITERIA FOR THE CLASSIFICATION AND DIAGNOSIS OF HEART DISEASE.** Third Edition. By the Criteria Committee of the Heart Committee of the New York Tuberculosis and Health Association. New York: New York Tuberculosis and Health Association, 1932. 131 pp. Price, \$1.00.

**THE INCOMES OF PHYSICIANS.** By Maurice Leven. Chicago: University of Chicago Press, 1932. 135 pp. Price, \$2.00.

**ORGANIZED MEDICAL SERVICE AT FORT BENNING, GEORGIA.** By I. S. Falk. Chicago: University of Chicago Press, 1932. 119 pp. Price, \$90.

**SURVEYS OF THE MEDICAL FACILITIES IN THREE REPRESENTATIVE SOUTHERN COUNTIES.** By C. St. C. Guild. Chicago: University of Chicago Press, 1932. 172 pp. Price, \$1.00.

**THE COMMON COLD.** By David Thomson and Robert Thomson. Published for the Picket-Thomson Research Laboratory. Baltimore: Williams and Wilkins, 1932. 738 pp. Price, \$15.00.

**PREPARATION FOR MARRIAGE.** Edited by Kenneth M. Walker. New York: Norton, 1933. 175 pp. Price, \$2.00.

**THE MEDICAL SECRETARY.** By Minnie Genevieve Morse. New York: Macmillan, 1933. 162 pp. Price, \$1.50.

**EVERYDAY PROBLEMS IN HEALTH.** By Frank Merrill Wheat and Elizabeth T. Fitzpatrick. New York: American Book Co., 1933. 440 pp. Price, \$1.20.

**CLINICAL DIAGNOSIS, PHYSICAL AND DIFFERENTIAL.** By Neuton S. Stern. New York: Macmillan, 1933. 364 pp. Price, \$3.50.

**THE FUNDAMENTALS OF GOOD MEDICAL CARE.** By Roger I. Lee and Lewis Webster Jones. Chicago: University of Chicago Press, 1933. 302 pp. Price, \$2.50.

**HEALTH STORIES, BOOK ONE.** By Anna B. Towse and William S. Gray. New York: Scott, Foresman & Co., 1933. 144 pp. Price, \$60.

**PROGRESSIVE SOCIAL ACTION.** By Edward T. Devine. New York: Macmillan, 1933. 225 pp. Price, \$1.75.

**DISEASES OF THE HEART.** By Sir Thomas Lewis. New York: Macmillan, 1933. 297 pp. Price, \$3.50.

**AMATEUR NURSE.** By Mary Wright Wheeler. Indianapolis: Bobbs-Merrill, 1933. 234 pp. Price, \$2.00.

**MARRIAGE.** By Ernest R. Groves. New York: Holt, 1933. 552 pp. Price, \$3.50.

## NEWS FROM THE FIELD

### MORALE—THE MENTAL HYGIENE OF UNEMPLOYMENT

THE paramount task facing relief workers today is to help the mentally distressed unemployed to preserve their sense of security, menaced, as it is on all sides by the prevailing economic conditions, Dr. George K. Pratt, psychiatrist, declares in a report, *Morale: The Mental Hygiene of Unemployment*, issued by The National Committee for Mental Hygiene, the purpose of which is "to help social workers, unemployment relief investigators and others to understand a little better what goes on in the minds of men and women who lose their jobs."

A very large proportion of the unhealthy mental reactions produced by the depression, Dr. Pratt explains, have their roots in various kinds of insecurities.

While the available statistics do not indicate a general increase in mental diseases serious enough to require hospital treatment, Dr. Pratt reports a great many lesser departures from average mental health and anticipates that "many who have been on the borderline of mental ill health for some time before employment will now go under."

Dr. Pratt points out the job facing every relief and social worker dealing with unemployed individuals as a two-fold one:

Along with the provision of material relief, and as part of this process, is the equally vital task of recognizing early signs of flagging morale and ministering in some measure to the security of the unemployed and their families.

Among the suggestions advanced to the relief worker for the management

of mental health problems arising out of the depression is the following:

When you believe there may be a morale problem involved as well as an acute relief problem, give the unemployed man or woman a chance to talk it out. Psychiatrists have learned that in numerous mental disorders, even when little else can be done by way of treatment, a copious talking out by the patient often results in at least temporary benefit. This process serves to drain off pent-up emotional tension and gives a feeling of relief and relaxation. For a social worker or relief investigator to cultivate deliberately the habit of being a good listener may prove to be half the battle in maintaining a client's morale and mental health.

Nor does the need to release unhappy tensions apply to the program of the social agency alone. Dr. Pratt would have the community also extend wide tolerance to citizens gathered together in groups for the purpose of free speech and public discussion.

Work for its own sake is also recommended as a

... life-saver to flagging morale and to the preservation of self-respect and mental health. "Work for health's sake" is not just a sop to the distracted man who cannot find a paying job. It is a vital need which helps him to maintain a feeling of worthwhileness, self-respect and accomplishment, as well as to keep him in the path toward a wholesome integration of his personality, without which mental health cannot exist. Almost any work will do, as long as it presents a reasonably definite task. . . . attention to the task in hand will automatically tend to shut out unpleasant and unhealthy introspection.

The development of recreational facilities as a further means for conserving individual and collective mental health is strongly advocated in the report which describes instances of effective work now being done along these lines by scores of communities alive to

the importance of leisure time activities as a morale measure.

The report also points to the mental health value of many of the activities now carried on by recreational, educational, religious, character-building and other social agencies faced with problems of human maladjustment.

The search for resources to bolster up morale and safeguard mental health does not necessarily nor always lead to the mental hygiene clinic or to the consulting room of the psychiatrist, indispensable as these facilities are in many instances. Today this search is likely to lead to the utilization of other resources which, until very recently, have seldom been thought of as having anything to do with mental hygiene.

Mental hygiene in its attempt to develop and preserve mental health becomes the responsibility of the whole community. It is something that cannot be isolated and apart. It is not special, separate, or unrelated to the rest of the community's daily life. It impinges on every one of our public undertakings. Its recognition moves all of our problems of unemployment back to the neighborhood of their source.—

450 Seventh Ave., New York. 64 pp.  
Price, \$.25.

#### CITIZENS' COUNCILS

**T**HERE is a national movement to eliminate waste and secure the greatest possible public benefit from expenditure of public funds in each community. This movement has developed from informal conferences, in New York, Chicago, and Washington, of representatives of nearly fifty national organizations — educational, cultural, social, civic, governmental. It was clear that the end sought could not be achieved by any over-all national action, but only by appropriate coöperation of citizen groups in each community and state. It has therefore been agreed that the national organizations should encourage their members to participate in the organization of local Citizens' Councils. In many states it will be desirable also to have State Councils.

"The National Municipal League

has agreed to act as the national headquarters. Funds are being solicited from the Foundations for the necessary expense of this office.

"A Citizens' Council would enable some of the most intelligent, socially-minded persons of the community to learn what are the essential facts about needs, costs, wastes, and possible economies in all the public and semi-public services. Through the organizations which the members represent these facts should reach large numbers of the population. And when there are recommendations to be made to the public authorities, whether for elimination of waste or improvement of a service, the Citizens' Council, in coöperation with the constituent citizen groups, should be able to speak with a voice that can be heard above the claims of any special interest."

More specific information about the development of this movement, and more definite suggestions for the organization and work of Citizens' Councils, can be obtained by communicating with Carl H. Milam, Chairman for the Joint Committee of Representatives of National Organizations, at the American Library Association, 520 North Michigan Avenue, Chicago, Ill.

#### MOTHER'S DAY

**U**NDER the leadership of a carefully chosen medical board, the Maternity Center Association of New York is planning its third annual Educational Campaign for Mother's Day, May 14.

Medical Societies, Boards of Health, Women's Clubs and civic organizations joined last year in the campaign to teach the public the vital importance of adequate maternity care. This year the same general plan will be pursued, with meetings held by organizations interested in the subject throughout the country during the week preceding Mother's Day.

Material for use in connection with a local Mother's Day observance is available free on application to the Maternity Center Association, 1 East 57th Street, New York, N. Y.

#### EDISON AND INDUSTRIAL HYGIENE

TO Dr. Leverett D. Bristol, Health Director of the American Telephone and Telegraph Company, we are indebted for the following interesting quotation attributed to Thomas Edison, dean of American inventors:

Coming generations of inventors will have to do their pioneering in the field of health. Electric light, telephone, radio, talking picture, automobile, air-plane—these things we have. What we have not is control over our own lives and bodies comparable to our control over material things. . . . Sickness is pretty hard on the workman. . . . There is too much sickness. . . . Something will have to be done about it.—*Baltimore Health News*, Jan., 1933.

#### SOUTHERN CALIFORNIA ASSOCIATION ELECTS OFFICERS

AT the Sixth Annual Meeting of the Southern California Public Health Association, held in Los Angeles on February 24, the following officers were elected for the year 1933:

*President*, Dr. W. B. Wells, Riverside; *President-Elect*, Dr. C. W. Decker, Los Angeles; *First Vice-President*, Dr. C. M. Sellery, Los Angeles; *Second Vice-President*, W. S. Mangold, Los Angeles; *Secretary-Treasurer*, Thomas P. B. Jones, Riverside; *Representative on Governing Council of A.P.H.A.*, W. T. Knowlton, Los Angeles.

#### THE ECONOMIC ASPECTS OF MEDICAL CARE

BECAUSE of a demand for information and literature concerning the subject, the economic aspects of medical care, a list of reading references has been prepared by the Julius Rosenwald Fund, one of the agencies which contributed to the Committee on the Costs

of Medical Care. These are designed to be of service. Inquiries concerning the literature or other matters connected with the subject may be addressed to the Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago.

#### CONFERENCES

April 3-8, New York Food and Health Exposition, Grand Central Palace, New York, N. Y.

April 4-6, American Water Works Association, Southeastern Section, Albany, Ga.

April 29-May 6, National Boys' Week.

May 1-May Day—Child Health Day.

May 29-31, Western Branch, A.P.H.A., Pasadena, Calif.

June 5-6, State and Provincial Health Authorities of North America, Washington, D. C.

June 5-6, State and Territorial Health Officers Conference, Washington, D. C.

June 11-17, National Conference of Social Work, Detroit, Mich.

June 12-17, American Medical Association, Milwaukee, Wis.

June 26-30, National Tuberculosis Association, Toronto, Canada.

June 26-30, Annual Meeting of the American Home Economics Association, Milwaukee, Wis.

June 27-July 1, Convention of the Association for Childhood Education, Denver, Colo.

July 1-7, National Education Association, Chicago.

July 5-9, International Union of the Protection of Childhood, Paris.

July 10-15, International Council of Nurses, Paris, July 10-12; Brussels, July 13-15.

July 18-20, International Congress of Pediatrics, London.

July 25-29, British Medical Association, Dublin.

July 29-August 4, World Federation of Education Associations, Dublin.



# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

May, 1933

Number 5

## Application of the Principles of Water Purification to the Control of Swimming Pools\*

A. H. FLETCHER AND A. E. CLARK

*Sanitary Engineer, Department of Health, Memphis, Tenn.; and  
Associate Engineer, State Department of Health,  
Nashville, Tenn.*

UNTIL quite recently the regulation of swimming pools generally received very little attention from health departments, either state or municipal. Many pools, where insufficient funds handicapped them, were built without any designing, and were constructed as a concrete tank to be operated on the "fill and draw" principle. A small amount of fresh water was added daily, and occasionally the pool was emptied, scrubbed and refilled.

Recently a number of cities have taken an active interest in the proper operation of their swimming pools. There has been a more or less scientific development and a more exacting control of the operation of the pools in these cities. The possibility of transmission of disease in swimming pools did not seem to arouse much attention until the early part of the 20th century. In 1915,<sup>1</sup> Manheimer cited 19 authori-

ties who reported venereal, ocular, aural, or intestinal diseases in pools. Hinman, in 1929, classified the diseases which could be contracted in the swimming pool. The Joint Committee on Bathing Places, in 1929, reported on foot diseases.

Detroit<sup>2</sup> carried on some work on skin diseases, beginning in the fall of 1929 when a dermatologist was engaged by the Health Department to do special work along this line.

Among the most prevalent infections which would possibly result from swimming are the common cold and sinus and middle ear infections. There are available very few data giving definite information concerning the part played by a swimming pool in the transmission of communicable diseases. The consensus of opinion of authorities seems to be that there is a potential danger of person to person transmission of pathogenic bacteria added to the pool by swimmers, and that this danger may be greatly minimized or eliminated by an efficient disinfecting agent

---

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.

such as chlorine. It is also believed that perhaps the greatest danger is of auto-infection, meaning the transfer of organisms harbored by the individual to more susceptible parts of the mucous membrane or the irritation or removal of protection from the membranes, resulting in an attack by organisms already there. From the standpoint of actual health protection afforded, and also esthetic considerations, it is now generally granted that facilities for effective sanitary measures and close supervision of the application of these measures is necessary and justifiable.

#### DEPARTMENT OF HEALTH PROBLEMS

The problems encountered by a city health department in developing a municipal swimming pool program usually indicate the following procedures:

1. A study of the existing pools and collection of data on each pool as to construction, equipment, and operation
2. A study of swimming pool control programs in other cities and states by correspondence and actual visits and by accumulating copies of rules and regulations successfully used
3. The preparation of a swimming pool ordinance to control existing swimming pools and to provide for approval of design and construction of new swimming pools
4. The initiation of a program of systematic supervision including all pools
5. Securing coöperation of all swimming pool owners and operators in furnishing monthly reports and making recommended improvements
6. Development of a sound educational program by which the public will be informed and induced to select only the safest places for swimming

A state-wide problem in the control of swimming pools has been created by the stimulation of interest in bathing and swimming. This interest has been created through health education, extensive advertising, and automobiles making it easy to travel greater distances for recreational purposes.

The construction of a large number

of artificial pools in late years has been partially due to the increasing pollution of streams and other natural bathing places.

Education of the public has created an attitude demanding an acceptable water in pools. The owners expect regulations and look to the city and state health departments for advice and recommendations for proper operation. Those contemplating the construction of new pools want advice regarding all points which will affect the operation and production of a satisfactory water.

State departments of health are expected to and have a responsibility to give competent advice on the operation of swimming pools. In actual practice these departments are faced with a wide variety of problems. Equipment and other facilities range from nothing to the modern well equipped efficiently operated natatorium. Immediate results must be obtained in spite of inadequate equipment and makeshift operation, and at the same time recommendations of the department must be successful in order to obtain improvements as recommended. The study covered in this paper was made for the purpose of obtaining additional data and experience to be used as a basis for more authoritative technical service by health departments.

#### DEVELOPMENT OF THE CONTROL AND STUDY PROGRAM

No record or evidence of any effort on the part of the health department to control swimming pools can be found previous to 1929. Samples of water have been collected each year apparently for information without any effort to better conditions.

Early in the year 1930, it was decided to develop a swimming pool program in Memphis and part of the time of one inspector was assigned for the regular collection of samples for

bacteriological examinations and to instruct the owners and operators of swimming pools in the use of chlorine for swimming pool disinfection.

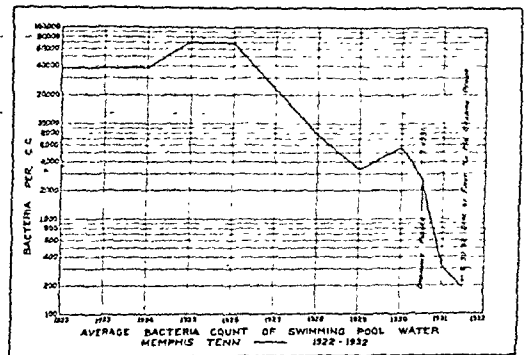
An attempt was made to assemble accurate information on quality of water and method of operation since 1922. The averages of bacterial counts on the total samples taken from all pools by the City Health Department are shown by years in Figure 1. A rapid improvement is noted after the year 1926. No comprehensive or reliable records of operation were found to be available. A monthly report form was prepared and put into immediate use, including all pertinent operating data and results of bacteriological examinations, the last being filled in at the City Health Department office.

A coöperative arrangement was approved, under which a sanitary engineer of the State Health Department was assigned to work with the Division of Sanitation of the Memphis City Health Department throughout practically all of the bathing season of 1931, in order to carry out a control and study program covering the various points mentioned. This program was carried out by the writers, assisted in routine work by a full-time sanitary inspector of the city.

A systematic survey of 14 of the principal pools in the city was made, a tabulation of the data obtained being given in Table I. A study of this indicated that on account of the wide variety of conditions with reference to construction, equipment, bathing load, and ability to make extensive improvements, some revision of the proposed ordinance would be necessary. The principal effect of these changes was to make allowance for light bathing loads, unusually good operation, and other favorable conditions, and under favorable conditions to extend the time limit within which complete equipment

would be required on existing pools. Strict requirements for new pools remained in the ordinance as finally passed in July, 1931. The control and study program was carried out under this ordinance, a copy of which may be obtained from the City Health Department of Memphis.

FIGURE 1  
DEPARTMENT OF HEALTH, MEMPHIS, TENN.



Each pool was required to have an orthotolidine testing set, either a commercial set or an inexpensive one made up by the City Health Department. Daily records of operation available for examination by health officials were required. The routine duties of the inspector carrying out the control program included, a visit to each pool at least once a week, personally checking residual chlorine in the pool, and collecting samples for bacteriological examination. Two samples were regularly collected from each pool, one from the shallow and one from the deep end, the orthotolidine test being made at the same point and at the same time. The location of the sampling point, and time of weekly visits to various pools, were varied. Pool owners were notified by mail of the results of examinations and instruction by visit was given when laboratory reports were found unsatisfactory. Routine instructions were given to maintain the residual chlorine between 0.2 and 0.5 p.p.m. at all times a pool was in use.

TABLE I  
SWIMMING POOL EQUIPMENT AND BATHING LOAD DATA  
1931  
*Department of Health, Memphis, Tenn.*

Name of Pool	Operator	Official in Charge	Capacity of Pool in 1,000 Gal.	Type of Pool	Year Built	Pumps	
						Number	Total Capacity GPM
Baptist Hospital	Mr. Earheart	Supt. G. D. Sheats	24	F & D	1920		
Catholic Club	H. F. Linder	Mgr. Marie Verrett	100	Recirc.	1923	1	180
Country Club	Miss Eickling	Pres. Dr. R. McKinney	90	F & D	1920	(Equipment 1)	140
East End	James Grisham	Owner H. W. Brennan	400	Recirc.	1923	1	278
Elks Club	W. O. Butler	Pres. Geo. Hasinger	98	Recirc.	1927	1	160
Fair Grounds	J. O. Graham	Supt. Dave Renfrow	1,250	Recirc.	1922	2	520
Malone	Curtis Turner	Supt. Dave Renfrow	400	F & D	1928		
19th Century Club	N. Stryker	Pres. W. Campbell	98	Recirc.	1926	1	250
Shrine Club	Mr. Briscoll	Sec.-Treas. W. A. Woodmansee	98	Recirc.	1924	1	140
St. Agnes	Miss Marquett	Sister Margaret O. P.	52	Recirc.	1927	1	60
University Club	Mr. Clark	Pres. Norman Monaghan	55	F & D	prior 1925		
Washington Park	V. J. Majestic	Supt. Dave Renfrow	914	F & D	1925		
Y. M. C. A.	R. H. Bruce	Gen. Sec. R. C. Pifer	45	F & D	1909	(Equipment 1)	
Y. W. C. A.	Mrs. Muir	Supt. Mrs. Muir	70	Recirc.	1926	1	120

\* (Becker's Formula, p. 38, Vol. XV, *J. Am. Assn. for Health & Baths.*)

#### EXPERIMENTAL STUDIES—GENERAL

A survey of the swimming pools in Memphis showed 14 pools in 1931 with approximately 250,000 swimmers and an additional 6 suburban pools patron-

ized by Memphis people. The problem in Memphis was to control and raise the standard of these pools, all but 2 of which had been built previous to 1926 and one of them as early as 1909. They

TABLE I (Cont.)  
 SWIMMING POOL EQUIPMENT AND BATHING LOAD DATA  
 1931  
*Department of Health, Memphis, Tenn.*

Filters		Present Turn- over Period in Hours	Average Daily Attend- ance	Maxi- mum Daily Attend- ance	Days Pool Oper- ated	Total Attend- ance	Turnover Permissible for Present Bathing Load *	Sterilizing Equipment
Num- ber	Total Capa- city GPM							
			22	30	67	1,476	14	None
2	170	10	27	200	365	10,027	12	2 Violet Rays
not 2	used) 120		49	100	96	4,706	15	Chlorinator (not in use)
3	250	27	350	1,500	127	44,456	10	W&T Chlorin. & Ammoniator
2	170	10	68	150	365	24,700	13	2 Violet Rays
3	450	46	825	3,000	80	66,071	11	2 W&T Chlo. 1 W&T Ammo.
			470	800	80	37,600	12	None
2	76	21	75	250	247	18,500	11	Violet Rays
3	250	12	53	150	60	8,820	13	Violet Rays
2	100	14	20	40	120	2,400	17	M.S.P.M. Chlorinator
			31	100	77	2,371	12	None
			65	500	80	5,200	19	None
not 2	used) 75	10	53	100	365	19,250	12	None
2	42	28	10	20	75	750	23	None

N.= Number  $\frac{\text{Bathers.}}{\text{Days}}$  G.= Capacity of pool in Gal. T.= Turnover in Hours.

$$T = \sqrt[3]{\frac{3.48 \times G}{N}}$$

presented a multiplicity of problems with only about one-half of them "recirculating" pools, several of these with distinctly poor distribution of inlets and inlet flow and with turn-over

periods varying from 46 hours to 10 hours. Four of the latest designed pools were equipped with ultra-violet ray machines, while 3 were equipped with chlorinators.

The bacteriological examination of samples soon showed that it was impossible to obtain counts below 200 per c.c. and absence of *B. coli* in 10 c.c. portions without the use of chlorine or chlorine compounds. The problem of securing better distribution of chlorine in the recirculating pools and of maintaining chlorine residuals in pools where it was necessary to add chlorine by hand made it necessary to study the various types of pools with regard to chlorine disinfection, distribution of inlets, use of anhydrous ammonia and ammonium sulphate to maintain residuals, control of algae, and other problems.

The major portion of the experimental work was devoted to a study of disinfection of pool waters from the standpoint of chlorine and chlorine compounds alone and in conjunction with ammonia and ammonium sulphate using machine and hand application. The primary object was the uniform production of a water which would meet the drinking water standards of the U. S. Public Health Service. Standards of bacterial quality are not uniform between various states, but since the average bather will swallow some water while in the pool the writers believe that it should meet the above standards. The study was conducted with this in mind, and to find whether it is practicable to apply such a rigid standard to pool waters.

The studies included the practicability of enforcing changes on existing pools which do not have equipment sufficient to meet the demands of present-day practice, such as filter capacity for an 8- or 12-hr. turn-over, scum gutters entirely around the pool, proper inlets, number and spacing, apparatus for the application of chlorine gas and anhydrous ammonia.

Further study was devoted to the sand beaches, the control of algae and slime on the floors of pools. There was some question whether sand beaches

using relatively clean sand would prove detrimental to the pool water, and whether under these circumstances it would be necessary to require the installation of additional showers to be used by each bather before returning to the pool. Slime on the floors of pools has caused considerable trouble and its elimination by the use of chlorine was studied.

Algae control did not receive as much consideration in this study as its importance would indicate since it is a major problem in most outdoor pools. Some data were obtained during this past summer at 2 new pools located in Nashville, Tenn.

Three pools were selected for study. The Municipal Fair Grounds Pool, 1,125,000 gal. capacity varying in depth from 3" to 10' was selected on account of its equipment which consisted of a complete recirculating system capable of turning the pool over in approximately 48 hrs., two Wallace & Tiernan vacuum type chlorinators, and an ammoniator. The pool is arranged as shown in Figure 2, equipped with a scum gutter extending entirely around it, inlets spaced entirely around the pool, a sand beach extending approximately one-half the distance around it, and compulsory showers. Good superintendence, supervision, and operation are provided, and spectators are excluded from the pool walkway and beaches by a metal fence.

The East End Pool, rectangular, holding approximately 400,000 gal., has recirculating equipment sufficient to turn the water over in 27 hrs. at the rate of 3 gal. per sq. ft. of filter sand area and a chlorinator of Wallace & Tiernan manufacture type M.S.A. A scum gutter is provided only at the deep end with sand beaches at each end. The inlets, 4 in number, are at the shallow end (Figure 3). Showers are not compulsory. Water varies in depth from 2' to 11'. It was necessary dur-

ing the period of this study to apply chlorinated lime solution and late in the season ammonium sulphate by hand. Spectators are not allowed on the pool walkway or beaches.

Malone Pool is municipally owned, holding approximately 400,000 gal. and varying in depth from 3' 9" to 10', nearly square, and with a scum gutter at one end. Located 22' below normal ground level it is a problem to keep surface wash out during heavy rains. A sand beach is located at one end. No equipment is available at this pool and all disinfection was accomplished by hand. Access can be had to the pool on all sides, no admission is charged nor are showers compulsory. Figure 4 shows the layout of this pool.

Samples for bacteriological examina-

tion were collected daily, except Sunday, from each pool. Four samples were collected from the Fair Grounds pool and 2 each from the others. Total count on agar 37°—24 hrs. was determined on each sample and tests for *B. coli* were made of 10 c.c. portions in standard lactose broth. *B. coli* results were partially confirmed. Three 10 c.c. portions were run on the Fair Grounds and East End Pools and one 10 c.c. on the Malone Pool samples. Practically all samples were collected during bathing periods, and usually during the heaviest bathing load. Samples were taken to the laboratory immediately and planted at once.

Tests for residual chlorine were usually made twice daily, morning and afternoon at the time and place the

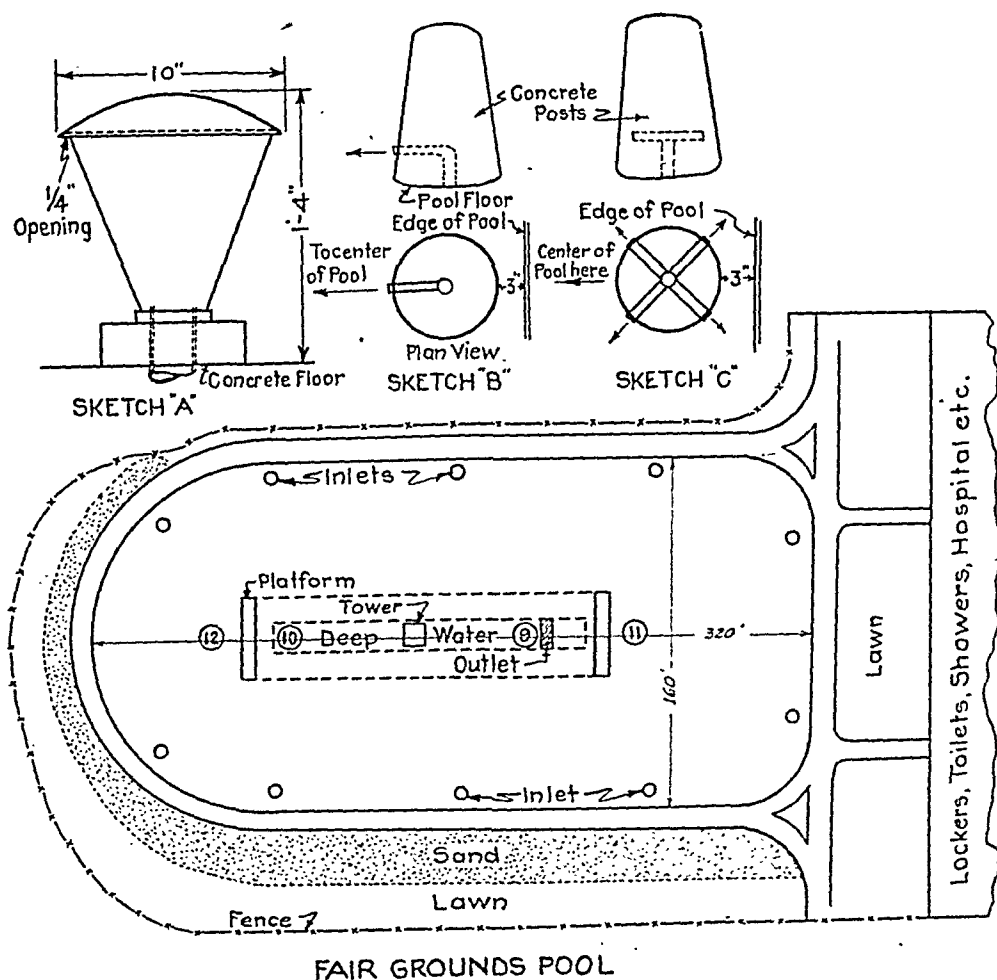


FIG. 2

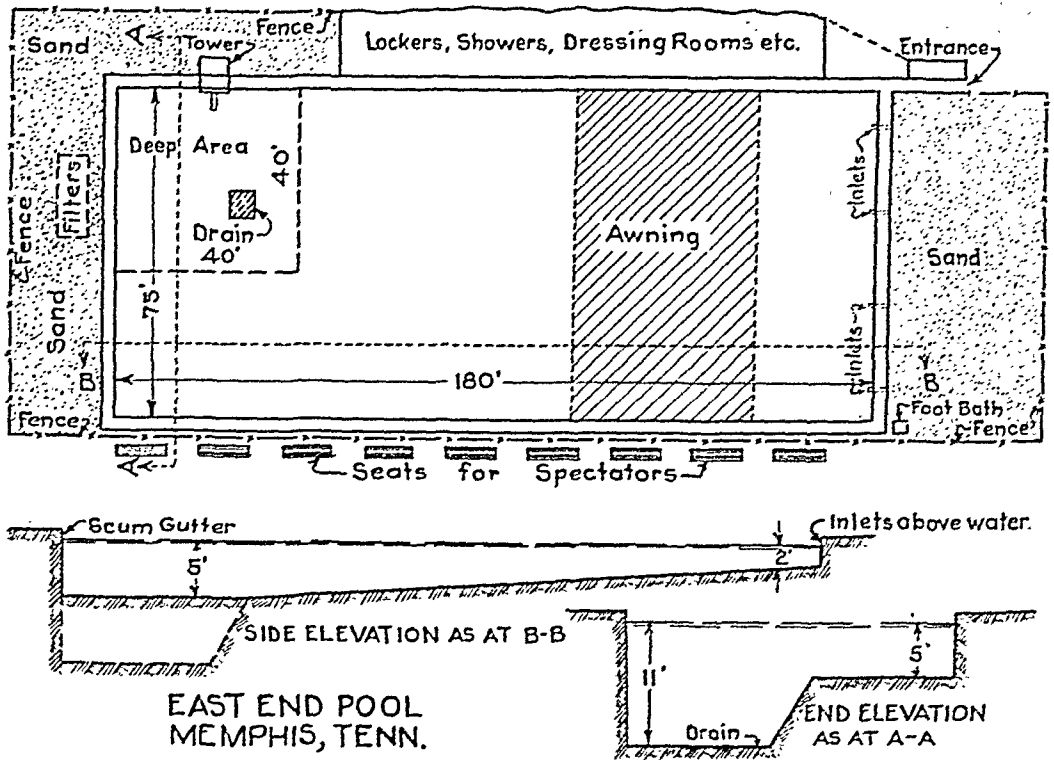


FIG. 3

samples were collected. Hydrogen-ion tests were made sufficiently often to show any marked variations. Operating data, such as hours the filters were operated, chlorine and ammonia used, water added, bathing load, air and water temperature, were kept as accurately as possible. A special series of examinations was run to determine the latent disinfecting value of the pool water using chlorine and ammonia.

Close supervision was given to the operation of the pools and at each suggestions made by the writers were complied with. Draining of the pools has been at frequent intervals, never more than 1 week elapsing between. A study was made to observe the effect of lengthening the intervals between draining.

Some data were collected on the cost at the Fair Grounds Pool, particularly of chlorine, ammonia, and water.

A short study was made of a salt water pool with particular reference to

infections of the respiratory and aural tracts.

Particular attention was given to complaints from the bathers due to smarting of the eyes, especially when high residuals were carried, using chlorine and ammonia.

#### DETAILS OF EXPERIMENTAL STUDIES

##### *Pool No. 1—Fair Grounds Pool—*

This is the first season during which

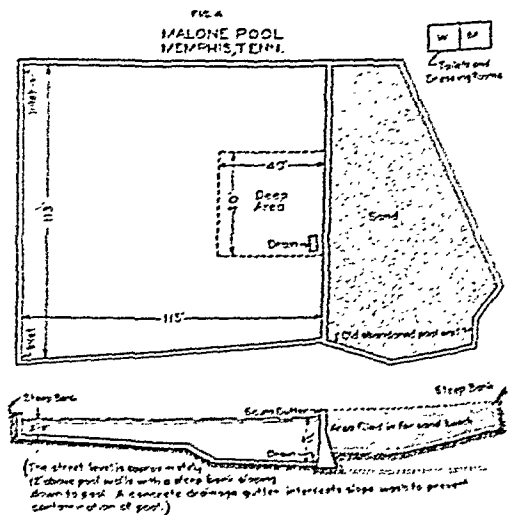




TABLE II

Period	No. of Samples Taken	Average Bacterial Count	Sanitary Rating
		Agar 37° — 24 hours	
1922-23-24	229	34,532	511
1925-26	39	50,895	346
1927	No samples taken		
1928	26	9,095	790
1929	No samples taken		
1930	13	1,178	950
1931 (Up to 7-7-31)	96	32	1,000
1931 (Since 7-7-31)	60	.8	1,000

TABLE III

Year	Pounds Used		Average Per Day		Total Cost	Days Operated	Cost per Day
	Cl <sub>2</sub>	NH <sub>3</sub>	Cl <sub>2</sub>	NH <sub>3</sub>			
1928	2,800	0	30	0	\$343.80	93	\$3.70
1929	3,300	0	37.5	0	358.08	88	4.07
1930	2,500	0	29	0	232.92	86	2.70
1931	1,450	253	19.3	3.4	179.20	75	2.39

any concerted effort has been made to study the operation of this pool, either from the standpoint of economy or better and more efficient operation. Before going into details regarding the study, the results of bacteriological examinations for previous years are given in Table II.

In previous years it has not only been difficult to distribute the chlorine equally throughout the pool, but excessive doses have been required to obtain even a trace in the middle. Following are the quantities of chlorine and ammonia used from 1928 to 1931, inclusive, with the cost.

It has been the practice to drain and clean the pool each week. This was done on Sunday nights, the pool remaining drained part of Monday, and refilled for use Tuesday morning. The costs of water for the years 1928-1931 are given in Table IV.

TABLE IV

Year	Total Cost of Water	Days Operated	Average Cost Per Day
1928	\$2,648.64	93	\$28.50
1929	3,469.15	88	39.50
1930	2,928.77	86	34.00
1931	1,784.03	75	26.50

The attendance during the years 1928-1931 has not shown any marked variations (see Table V).

TABLE V

Year	Total Attendance	Average Daily
1928	82,040	880
1929	79,309	900
1930	82,218	960
1931	67,762	905

The pool was opened on June 6, at which time only chlorine was being used. Both chlorinators were operated at capacity, applying approximately 40 lb. of chlorine per 24 hrs. Residual chlorine tests taken at 10 different points in the pool showed erratic results, varying from a trace in the deep part to more than 1.0 p.p.m. in the shallow portions. When the ammoniator was started, one chlorinator was shut down and the other left on, set at 30 lb. per day. The ammoniator was set at 5 lb. per day. After operating 24 hrs. an increase was noted in the residual chlorine content, and particularly in the middle of the pool a very noticeable increase was found. On the second day the residual chlorine tests were uniform all over the pool at whatever point it was tested. On the third

TABLE VI

EXPERIMENTS TO DETERMINE THE LATENT STERILIZING VALUE OF WATER COLLECTED FROM SWIMMING POOLS DURING THE SEASON OF 1931

Source of water	Fair Grounds Pool			Fair Grounds Pool			Fair Grounds Pool			Fair Grounds Pool		
Date collected	7/22/31			8/6/31			8/7/31			8/13/31		
Chlorination	Chloramine			Chloramine			Chloramine			Chloramine		
O.T. Test	0.5 p.p.m.			0.4 p.p.m.			0.3 p.p.m.			0.5 p.p.m.		
Culture	B. Coli from water			B. Coli from feces			B. Coli from feces			B. Coli from feces		
	Gas formation Lactose broth 10c.c. 1c.c. 0.1c.c.			Gas formation Lactose broth 10c.c. 1c.c. 0.1c.c.			Gas formation Lactose broth 10c.c. 1c.c. 0.1c.c.			Gas formation Lactose broth 10c.c. 1c.c. 0.1c.c.		
	Agar Count			Agar Count			Agar Count			Agar Count		
Water from pool	-	-	-	0	-	-	-	0	-	-	-	0
Blank culture 1-100	x	x	x	1000	x	x	x	37	x	x	x	98
Culture & water 1-100 (1 min.)	x	x	x	500	x	x	x	35	x	x	x	79
Same (2 min.)	x	x	x	50	x	x	x	31	x	x	x	71
" (3 min.)	x	x	x	12	x	x	x	20	x	x	x	70
" (4 min.)	x	x	x	8	x	x	x	22	x	x	x	31
" (5 min.)	x	x	x	4	x	x	x	19	x	x	x	2
" (10 min.)	x	x	-	1	x	x	x	10	x	x	x	0
" (15 min.)	-	-	-	0	x	x	x	4	x	x	x	1
" (20 min.)	-	-	-	0	x	x	-	1	x	x	x	0
" (25 min.)	-	-	-	0	-	-	-	0	x	x	x	0
" (30 min.)	-	-	-	0	-	-	-	0	x	-	-	0

day residuals greater than 1.0 p.p.m. were found at all points. The Enslow Comparator was used for making all residual tests, and color was developed at the end of 4 minutes.

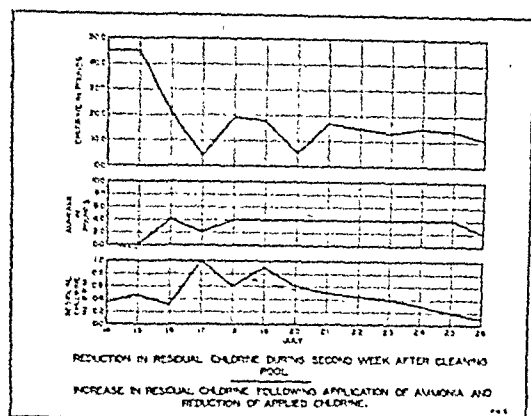
Throughout the use of ammonia-chlorine a definite cumulative effect was observed, most pronounced when the water was fresh and contributions of organic matter by heavy bathing loads at a minimum. For example, it was sometimes necessary to shut off both machines for periods varying from 4 to 24 hours in order to reduce chlorine residuals and to reduce the dosage when the chlorinators were started again. In order to maintain effective residuals it was necessary to increase chlorine dosages during the latter part of the 2-week period between cleaning and refilling the pool (Figure 5). It was also

observed that an increase of the use of copper sulphate up to approximately 3.5 to 4 p.p.m., applied every third day, tended to reduce the chlorine demand, presumably by more effective control of algae, and to restore the cumulative effect of the ammonia-chlorine application.

Considerable attention was given to the bathers, particularly complaints of smarting of the eyes. There have been very few complaints made during this season. The pool manager has stated once or twice when the residuals were 1.0 p.p.m. he noted a smarting of his eyes.

During the period June 6 to August 8, 178 samples were collected from this pool for bacteriological examination. Figure 2 shows the location of the sampling points, which are numbered

FIGURE 5



9, 10, 11, and 12. Sampling points 11 and 12 are in water approximately 3' deep, while 9 and 10 are in the deepest part of the pool.

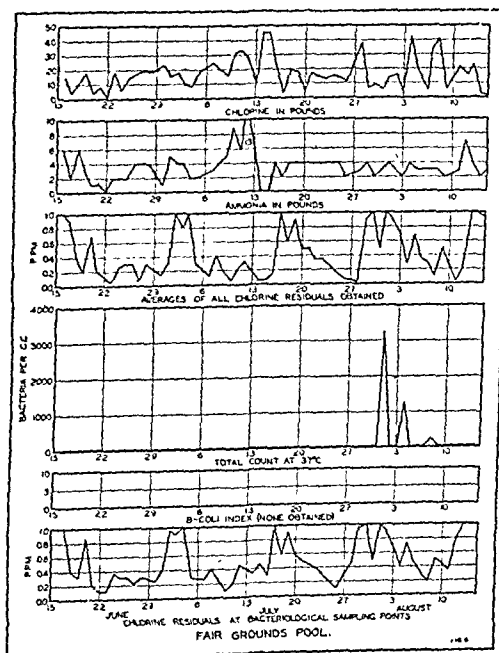
The results of the examinations during this period are shown graphically in Figure 6. The average number of bacteria per c.c. is 117. Eleven samples in 3 days showed high counts which totaled 16,900. However, on these days samples were collected by a person not accustomed to sampling. This must have been the reason for erratic results, since the residual chlorine tests on these 3 days indicated sufficient to produce low counts. Therefore, these results have been discarded and the average for 167 samples is 7 bacteria per c.c. The residual tests have varied from a trace to over 1.0 p.p.m. The results obtained indicate that with residuals between 0.2 and 0.5 p.p.m. uniformly low counts can be expected. With residuals less than 0.2 p.p.m. results may be erratic as indicated by an example. On different days each with water 12 days old and an average residual of 0.12 p.p.m. the average bacterial counts on 4 samples were 206 and 0.5 respectively.

The results of *B. coli* determination have been satisfactory, in that of 534 portions tested, only 4, or 0.75 per cent, have shown evidence of *B. coli* and after June 15 no portions were found positive (see Figure 6). Of the 4

positive portions mentioned above, 3 were from a single sample, having a zero bacterial count, an erratic result to which the writers attach little significance.

The total amount of chlorine used during 75 days of operation was 1,450 lb. Six days ammonia was not used, and the chlorine consumption during this time was 250 lb., an average of 41.7 lb. per day, or 4 p.p.m., based on total pool capacity. During 69 days a total of 253 lb. of ammonia was used, together with 1,200 lb. of chlorine. This shows while using ammonia-chlorine a daily average of 17.4 lb., or 1.7 p.p.m. of chlorine and 3.7 lb., or 0.35 p.p.m. of ammonia. The average ratio of chlorine to ammonia was 4.2 to 1. The ratios were varied over a wide range, the maximum being 12 to 1 and the minimum 1.25 to 1.

FIGURE 6



The cost of chlorine this season has been \$.09 per lb., and the ammonia averaged \$.1925 per lb. The average daily cost of using the chlorine ammonia process during 69 days was, chlorine \$1.56 and ammonia \$.71. The

average daily cost of using chlorine during the 6-day period was \$3.75. These figures show that there was an actual saving of \$1.48 per day using the chlorine ammonia process, assuming that results were comparable. Daily averages, showing quantities and cost of chlorine, for entire season of 1928 to 1931 inclusive have been given already in Table III.

The total number of bathers from June 6 to August 1, was 55,365, an average per day of 1,130, the maximum number on any one day being 3,193 and the minimum 21.

The water temperatures during the period June 6 to August 1, varied from 80° to 86° F. Although no correlation between water temperatures and sanitary quality was observed high temperatures will cause complaints from bathers and in southern states this may be the factor controlling frequency of draining outdoor pools.

The recirculating system operated 24 hrs. per day. Water was added each day to replace that lost as well as to flush the surface. The amount recirculated varied from 400,000 to 640,000 gal. per 24 hrs., with an average of 565,000 gal. Water added each day averaged 72,000 gal. The practice of draining and cleaning the pool each week was discontinued and the interval lengthened to 2 weeks. At all times during the season it has been easily possible to see the bottom in the deepest part of the pool.

The interval between draining could have been lengthened except for the slime which formed on the floor of the pool. The practice has been to drag 5 lb. of copper sulphate around the pool every other night. An increase of copper sulphate dosage to 7 lb. every 2 days was beneficial and a dosage of 50 lb., or 3.5 to 4 p.p.m. every third day was effective in killing algae after which the vacuum cleaner would pick up the slime. High chlorine residuals

apparently would not prevent slime formation.

Determinations of pH were made at frequent intervals over a sufficient length of time to show that it is relatively constant and shows little variation. The minimum found was 7.4 and the maximum 7.6.

*Pool No. 2—Malone Pool*—Drainage facilities at this pool are very poor and a noticeable amount of mud accumulates on the sand beaches following every heavy rain. Water accumulates in depressions in the sand and bathers carry a certain amount of mud into the pool. This accounts to a large extent for the very noticeable turbidity 2 or 3 days after the pool has been cleaned and filled. It makes disinfection more difficult and less reliable (Figure 4).

Disinfection, in the absence of mechanical equipment, must be accomplished by hand application. Chlorinated lime, used at the rate of 15 lb. per day failed to show any positive residual tests. Assuming that the chlorinated lime contained 25 per cent available chlorine, this would be equal to 3.73 lb. of chlorine, or 1.13 p.p.m.

The writers gave this phase of the treatment considerable thought and it was finally decided that because of a high chlorine content, greater stability and ease in dissolving H.T.H. would be the most suitable chlorine compound. From previous experience it was felt that ammonia would be necessary to obtain residuals and, therefore, a technical grade of ammonium-sulphate having an  $\text{NH}_3$  content of approximately 25 per cent was used in conjunction with H.T.H., providing a ratio of 5 to 1 chlorine to ammonia.

Ammonium sulphate was first used on June 23 and June 24. This preliminary test indicated that residual chlorine of 0.2 p.p.m. or better could be maintained throughout the day. After waiting for an additional supply

of ammonium sulphate the ammonia-chlorine treatment was again started on June 30 and continued with minor interruptions throughout the season.

A study of the results indicate that chlorine residuals can be maintained over a greater period of time by using ammonia, and ultimately there will be an overlapping from day to day with a cumulative effect previously mentioned. For example, on the morning of July 16, 8 lb. of H.T.H. and 4 lb. of sulphate were added. On the morning of July 17 the residual was 0.5 p.p.m. at all points and without further chlorine application on the morning of July 18 the residual was 0.1 p.p.m. at all points. The bathing load at this time was light. Typical results during a heavy bathing load would show 0.7 p.p.m. after treatment, 0.5 p.p.m. in the middle of the afternoon, and 0.2 p.p.m. on the following morning.

During the period from June 18 to August 1, 60 samples were collected. The majority of samples were collected between 1:00 and 2:00 o'clock in the afternoon, but quite a number of them were collected in the morning—usually before the chlorine or chlorine and sulphate had been added in order to determine the condition of the water several hours after disinfection and to reflect the addition of organic matter by the bathing load of the previous day.

The average number of bacteria per c.c. for the 60 samples was 664. Thirty-two samples were collected when the residual test showed 0.2 p.p.m. or above, with a maximum count of 100 and a minimum of 0. The remaining 28 samples were collected when residuals were less than 0.2 p.p.m. and, as already explained, many in the early morning before treatment.

Of 60—10 c.c. portions tested 18, or 30 per cent, showed evidence of *B. coli*. Of these 10 positive tests were on samples collected before any disinfection had been added that day.

A concise summary of quantities of disinfectant used during the entire season is not possible because chlorinated lime and H.T.H., both with and without ammonium sulphate, were used interchangeably, depending upon the supply on hand. In general, it may be stated that chlorinated lime, applying a dosage of 0.76 p.p.m., used without ammonia, failed to show any test for residual chlorine. The use of H.T.H., providing 2.2 p.p.m., available chlorine, would show residuals above a trace throughout the pool for a varying period of time, depending on the bathing load and the amount of organic matter in the water. The use together of H.T.H. and ammonium sulphate, providing average dosages of 1.45 p.p.m. of chlorine and 0.26 p.p.m. of ammonia, was sufficient to show residuals of 0.2 p.p.m. or better throughout the day. This is a ratio of 5.6 to 1.0, chlorine to ammonia.

*Pool No. 3—East End Pool*—Tests made during the 1930 season showed definitely that with the dosage of chlorine applied to this pool by the chlorinator, residuals were found only about 20' from the inlets. In order to supplement the chlorine dosage from the chlorinator, a practice was made of adding a solution of chlorinated lime directly to the pool water.

The procedure for disinfection is somewhat out of the ordinary in that chlorination by means of a chlorinator was used, as well as hand application of chlorinated lime solution and ammonium sulphate. During the period June 16 to July 2 a solution of guaranteed 33 per cent chlorinated lime was used. According to the best figures obtainable, the accuracy of which the writers have some doubt, the average used was 16.1 lb. per day, a dosage of 5.3 lb., or 1.61 p.p.m. of chlorine. To this must be added the average amount of chlorine applied through the chlorinator, assumed to be 2.5 lb. per day,

averaging a total dosage of 7.8 lb., or 2.37 p.p.m. From June 16 to July 13 there was only 1 day on which the residuals were greater than 0.2 p.p.m., and the majority of the time they were either zero or just a trace. On July 13 the use of ammonium sulphate was started and it was used with either chlorinated lime or H.T.H. and also liquid chlorine during the remainder of the study. It was then possible to get residual tests above 0.2 p.p.m. fairly regularly, although there were times when lower residuals were found.

On August 8 the chlorinator began running 24 hrs. and after that time little difficulty was experienced in maintaining a residual between 0.2 and 0.5 p.p.m. in all parts of the pool. On August 11 the liquid chlorine dosage was increased to 8.8 lb. per 24 hrs. but on account of poor distribution this was found to cause odor near the inlets, and therefore, it was decreased to a dosage of approximately 5 lb.

It was found that the medium dosage of liquid chlorine in conjunction with chlorinated lime and ammonium sulphate solutions was most satisfactory in maintaining adequate residuals.

From June 16 to August 10, 93 samples were collected for bacteriological examination. The average of all bacterial counts was 558 per c.c.; 59 showed less than 200; and a majority of these less than 10. Checking total counts against chlorine residuals at sampling point, shows that in general with residuals of 0 or only a trace the count usually rises above 1,000 per c.c. There are relatively few samples showing greater than 10 bacteria per c.c. if the chlorine residuals were between 0.2 and 0.5 p.p.m.

A total of 279, 10 c.c. portions were tested for *B. coli*. A positive test was obtained on 15 or 5.4 per cent of the total. These *B. coli* results were more satisfactory than the total bacterial counts. During the period June 16 to

August 11 the number of bathers was 34,349, or a daily average of 613, with a maximum of 2,263 on June 28 and a minimum of 5 on July 23. The water temperatures have varied between 76° and 86° F., and again there did not seem to be any correlation between water temperature and sanitary quality.

Relatively little trouble from algae was experienced and relatively little slime formed on the bottom. Water has been left in this pool 11 days and the small amount of slime that did occur was confined to the deep portion.

Accurate figures not being available, it has been estimated that approximately 370,000 gal. of water per day were recirculated, but no estimate has been made of the daily quantity of make-up water added. The practice had been to drain, clean and refill this pool twice each week, but since starting 24-hr. operation of the recirculating system, it was seldom drained in less than a week.

*Salt Water Pool at Monroe, La.*—The pool at Monroe has a capacity of 1,500,000 gal. and an average depth of 3.5'. Walls are constructed of concrete with a sand floor. No scum gutters are provided. Disinfection is accomplished by adding liquid chlorine to the suction line of a 900 g.p.m. circulating pump, taking the water from one end of the pool and putting it back at the opposite. The salt water is obtained from a flowing well discharging into the pool approximately 400 g.p.m. A chemical analysis at the time these tests were made showed 1,250 p.p.m. of chlorides. The bacteriological results of 4 samples collected from the pool showed relatively low counts, but examination of previous records indicated that about 25 per cent of all 10 c.c. tubes showed gas formation, *B. coli* results not being confirmed.

Three eye, ear, nose, and throat specialists were visited and requested to state their opinions on 4 questions as

to the relative number of infections believed to have been contracted from bathing in fresh or in salt water; the cause of the infection whether from the water or mechanical injury; the advantages if any of swimming in salt water; on the comparative number of patients treated this season as against previous seasons.

As would be expected, the answers to these questions varied. Two believed that there is no difference between salt and fresh water either in cases treated or as to the advantages for bathing. One thought that salt water was beneficial from both standpoints. All believed that there was greater danger of infection due to mechanical injury rather than actual transmission through the water. No definite comparison of number of patients treated this season as against previous seasons was obtained.

*Municipal Pools at Nashville, Tenn.*  
—Two municipal pools constructed during 1932 by the City of Nashville furnished an excellent opportunity to try out some ideas based on the Memphis study, and collect further data on operation. Experience in the design and first year's operation at these pools have confirmed the writers' opinion that exact hydraulic design of the system for distribution of water and chlorine to all areas is essential to success of operation.

The 2 pools are both of approximately the same capacity, with equipment and construction to comply as far as possible with present-day practice. The capacity of each is approximately 330,000 gal. An ammoniator is installed at each pool. Inlets are spaced around all sides and the piping as well as the inlet plates designed for equal distribution of the incoming water. Recirculating equipment is designed for an 8 hr. turn-over. With this design it is possible to note an increase of chlorine residual in the center of the

pool within about 30 min. after the chlorine dosage has been increased, and uniform distribution of chlorine is obtained.

Arrangements of dressing rooms, showers, toilets, etc., are satisfactory. Unfortunately both pools are located near trees, which have given considerable trouble, leaves falling into the pools, causing an increase in the chlorine demand, and interfering with the operation of vacuum cleaners.

Wallace & Tiernan chlorinators and ammoniators are used, the chlorinators having a maximum capacity of 10 lb. per day. During normal conditions this apparatus in conjunction with ammonia gave residuals varying from 0.2 to 0.7 p.p.m. Following a storm, during which a considerable amount of leaves and dust was blown into the pools, residuals dropped practically to 0 and following this it was impossible to obtain residuals greater than 0.15, operating the chlorinators to capacity, until after the pools were drained and cleaned. It is advisable to have apparatus of adequate capacity to take care of abnormal as well as normal conditions. Good bacteriological results have been obtained.

Uniform doses of copper sulphate have been added to each of the pools, averaging from 10 to 12 lb. every third day, corresponding to a dosage of 3.6 to 4.2 p.p.m. It has been necessary to shorten the interval between dosing on a few occasions due to growth of algae. This is noticed first on the walls, particularly back of the ladders. At these times the chlorine demand is increased and higher doses of chlorine up to the capacity of the chlorinator usually fail to raise residuals above 0.2 p.p.m. The residual immediately increases following a copper sulphate treatment.

Vacuum cleaners capable of removing leaves are necessary at these pools if a clean bottom and proper residuals are

to be maintained. Except for excessive temperatures and collection of sediment on the bottom it would be possible to operate these pools throughout the season without draining.

#### GENERAL OBSERVATIONS

Observations of the effect of sand beaches during this study have failed to show any deleterious effect on the water in any way, provided the sand is clean. There is an apparent beneficial effect since in those portions of the pool bordering the sand beach there was less slime on the bottom, due probably to the scouring action of sand carried into the pool by bathers. At Malone Pool, where the sand becomes dirty by flooding during heavy rains, additional turbidity and possibly an increase in chlorine demand resulted.

It was desired to know what, if any, latent disinfecting properties the pool water had, using the chlorine ammonia process. Samples from the Fair Grounds Pool were collected in sterile bottles and taken directly to the laboratory. The residual chlorine test was made at the time and point at which the sample was collected. Plates were poured and tubes sowed for *B. coli* immediately, and following this the sample was inoculated with a known number of *B. coli* in 10 c.c., 1.0 c.c., and 0.1 c.c. Samples were tested each minute for a period of 10 min. and then every 5 min. up to 30 min. (See Table VI.)

As a guide to the use of the ammonia chlorine process during the study and to obtain a comparison of maintenance of residuals by this process as against the use of chlorine alone two determinations of the rate of reduction of residual chlorine in the Malone Pool were made on different days. Orthotolidin determinations were made frequently enough to obtain curves showing the reduction of residual chlorine. (Figure 7.)

#### SUMMARY AND CONCLUSIONS BASED ON EXPERIMENTAL STUDIES

1. The present studies have included close supervision of, and experimental work on, 3 outdoor swimming pools in Memphis, supplemented by observation of several other pools.

2. The maintenance of satisfactory residuals of chlorine, using chlorine or chlorine compounds alone, has not been found practicable in the pools studied. In recirculation pools, perhaps on account of the long turnover period, there was too great divergence in chlorine residuals between inlets and distant points. In pools requiring hand application of chlorine compounds residuals disappeared rapidly and additional applications during a single bathing period is not satisfactory.

3. The maintenance of satisfactory residuals of chlorine, using chlorine and ammonia, in the 3 Memphis pools studied was found to be practicable. Where recirculation equipment and location of inlets for uniform distribution is provided residuals above 0.2 p.p.m. can be maintained easily. Where recirculation equipment is inadequate or distribution poor residuals throughout the day can be maintained by supplementing machine application with hand application once before the bathing period. Where recirculation is not provided residuals can be maintained throughout the day by a single application of ammonia and chlorine before the bathing period.

4. Hand application of chlorine and ammonia compounds is not as satisfactory as continuous application of chlorine and ammonia by machine. If hand application is the only method available a high test chlorinated lime and a technical grade of ammonium sulphate were found to be satisfactory. In such cases it is necessary to dose for high residuals at the time of application in order that adequate residuals will remain throughout the bathing period.

5. Experiments to determine relative rates of reduction in chlorine residuals, using chlorine alone and chlorine with ammonia, were made and the results show a much more rapid reduction when chlorine is used alone.

6. The rate of reduction of chlorine residuals is increased by heavy bathing loads, growths of algae, addition of dust or leaves, and any other condition increasing the organic content of the water. The effect of such conditions in causing disappearance of chlorine residuals is very pronounced with chlorine alone and noticeable when chlorine and ammonia are used. Variations in temperature



of the pool water did not have any apparent effect upon the distribution or maintenance of chlorine residuals.

7. Flexibility of design in order to obtain additional reserve capacity in chlorination equipment and immediate distribution through proper design of piping system and inlets to all parts of the pool is emphasized as the most satisfactory method of counteracting unusually high chlorine demands resulting from any cause. A short turn-over period and uniform distribution are also important from the standpoint of appearance of the water, affecting rapidly with which turbidity can be removed from the water itself and also accumulation of material on the bottom in the shallow portions.

8. Bacteriological examinations for total bacteria and *B. coli* have covered ranges of chlorine residuals from 0 to 1.0 p.p.m. In general these results show that between residuals of 0.2 and 0.5 p.p.m. low bacterial counts can be expected, the use of chlorine alone and the chlorine-ammonia combination giving comparable results. Less reliable disinfection, shown by erratic bacterial results, was obtained when chlorine was used alone, and when hand application of chlorine with ammonia was employed. No explanation is offered but at the pool operating equipment 24 hrs. a day no high counts were noted until residuals had dropped to 0.1 p.p.m., while in the case of 2 pools using hand application a number of high counts were found between 0.1 and 0.3 p.p.m.

9. It is assumed from a study of literature and previous experience that the disinfecting action of chlorine alone is more rapid than is that of chlorine-ammonia. Experiments to determine the latent sterilizing value of water containing chloramines were made, the results showing that with residuals of 0.3 to 0.5 satisfactory disinfection is obtained in about 20 min.

10. Complaints of smarting of eyes and irritation of mucous membranes led to the conclusion that higher residuals of chlorine and ammonia can be carried without danger of complaint than with the use of chlorine alone. Hydrogen-ion concentrations were maintained between 7.4 and 7.6, and it is the opinion of the writers that with proper pH control, and the use of chlorine and ammonia no complaints should result from maintenance of residuals as high as 1.0 p.p.m.

11. Clean sand beaches are not detrimental to the quality of pool waters provided spectators are not allowed access to them. Trees, while providing shade, cause trouble due to leaves falling into the pool, affecting the appearance as well as increasing the chlorine

demand. Dust is detrimental in that turbidity is added to the water with contamination.

12. Scum gutters are a necessity if a pool is to be kept in satisfactory condition. There is a relatively large accumulation of floating material which collects and does not settle out.

13. The taking of a shower bath before entering the pool is considered essential and use of showers must be made compulsory, as at least 50 per cent of those using the pools will not take them voluntarily. Satisfactory use of showers can be obtained only by proper location, continuous operation, and personal supervision.

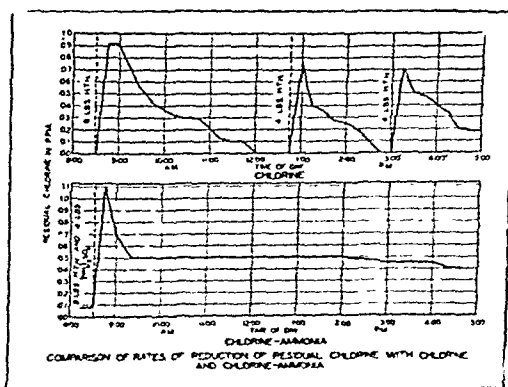
14. From the limited opportunity for observation at Monroe, La., the authors find no apparent public health value in the use of salt over fresh water. However, one of the authors who suffers from hay fever every year experienced a decided relief after swimming in the municipal salt water pool at Monroe. The cost of using saline water in a pool is considered impracticable if salt has to be purchased, but the use of salty well water is practicable if sufficient quantity is available.

#### APPLICATION TO CONTROL OF SWIMMING POOLS

*City*—The Memphis swimming pool ordinance allows a period of grace not to exceed 5 years to bring the existing pools up to the requirements. The first year or two is being used by the Health Department to study each pool under actual operating conditions. The ordinance also provides that each pool shall secure each year from the Health Department a permit to operate.

Following each swimming pool

FIGURE 7



season, it is planned to arrange for a conference with the owner or operator of each pool and discuss needed improvements for that pool. Following this conference the department will address a letter outlining the required improvements which will be expected before issuance of a permit to operate the following year. These studies will enable the department to insist on practical and intelligent improvements.

As the results of these studies it appears possible to maintain water in a swimming pool which will meet the bacteriological standards for good drinking water. In order to encourage consistently good samples the Memphis City Health Department has adopted a grading schedule similar to that used in Detroit, Cleveland, and Cincinnati, announcing 4 times during the year the rating of all pools, based on the quality of the water as shown by bacteriological tests. The concern shown by each pool following the first grading announcement which did not reach a 900 to 1,000 rating, classed as "A," demonstrated that in future ratings, practically every pool will probably be in class "A" rating. Ratings have been announced 3 times to date. Each rating was based on the percentage of good portions tested multiplied by 10, a good portion being one with a total bacteria count below 200 or a negative partially confirmed test for *B. coli* in 10 c.c.

It is believed that these studies will be of value in cooperating with architects and engineers in the design of new pools, or in making major changes and in the approval of plans for construction submitted to the City Health Department under the provisions of the ordinance.

**State**—The study and experimental work at Memphis has furnished a guide which is most valuable in the formulation and execution of a state-wide swimming pool program.

A state program should include:

A sound educational program

Advice to local health authorities in regard to legislation and procedures

Advice directly or indirectly to pool operators

Collection of data through surveys or submitted reports as a basis for judgment regarding the extent to which the state health department can afford to go in a state-wide swimming pool program

Education of the public should proceed along the lines that will create an understanding of the necessity of swimming pool control and of patronizing those pools which produce a satisfactory water and maintain the pool and appurtenances in a manner which meets the requirements of state or local regulations in every respect.

The state department of health must be in a position to give expert advice to the local health authorities in drawing up swimming pool regulations, formulation of a swimming pool sanitation program and general advice in regard to operation.

The result of this study provided the department with additional data upon which advice to engineers and architects can be based, particularly regarding recirculating equipment required and inlet design. One problem of pool design which has given considerable trouble is the irregular distribution of chlorine, particularly when fed by machine with inadequate recirculating equipment and improper spacing and design of inlets. Clarity of pool waters has been a problem in a number of pools, especially those subject to heavy bathing loads and where insufficient filter capacity is provided.

Sound advice to the operators of pools is most important, because the quality of a pool water is directly dependent upon operation. Some supervision is necessary along with instructions for proper disinfection, orthotolidin tests, proper alum dosage, proper copper sulphate dosage, time interval between washing the filters, use

of the vacuum cleaner and application of soda ash if required. Operators of pools having inadequate or no equipment have a more difficult problem to maintain a good water and more attention must necessarily be given to operation of this type of pool.

The active participation of the state department of health in promoting swimming pool control programs should lead toward standardization throughout the state and make the individual programs of various cities comparable.

#### GENERAL SUMMARY

The historical outline of the growth of swimming pools dates from 312 B.C., while the early development in purification of swimming pools in the United States dates from 1906. The interest in disease transmission in pools seems to have aroused very little attention until 1915. In the development of a state and municipal swimming pool program, certain problems were encountered.

Beginning in 1930 a swimming pool program was initiated in Memphis. A survey of the situation was made and other cities were visited and their programs observed. A coöperative arrangement between the city and state

was made to study the problem jointly. A swimming pool ordinance was finally passed in July, 1931, and a program of systematic supervision of all pools was instituted.

Between the years 1909 and 1926, 19 pools were built in Memphis. Thus a multiplicity of designs and problems were presented and it was found necessary to make a special intensive study of 3 general types before intelligent progress could be made in a practical program. Experimental studies were made and certain conclusions were reached. In addition to the pools in Memphis, limited information was gathered on a salt water pool and observations made on 2 newly constructed pools in Tennessee. Following these studies it has been possible to indicate certain applications to municipal and state swimming pool control programs. This presentation and discussion are given hoping that they may be of some value in other places.

#### REFERENCES

1. Shaw, Frank R. Swimming Pool Sanitation, *Municipal Sanitation*, June, 1931.
2. *Weekly Health Review*, Series 2, No. 15, Detroit Department of Health, week ending April 12, 1930.
3. Reports of The Joint Committee on Bathing Places, American Public Health Association and Conference of State Sanitary Engineers. Reprint from *A. J. P. H.*, 1930.

---

## Injuries Produced by Contact with Electric Circuits

AN extensive article summarizes earlier studies, the various factors provoking electrical mishaps, the ascertained cause of death and the effects upon the nervous symptoms, the heart, the blood pressure, the skin, musculature, blood vessels, and other less important points of localization.

Under several of these headings, the authors report their own findings, principally upon rats, but also some autopsy findings on 2 men who were electrocuted. There are also brief

resumés of the subject of treatment and of permanent disability. The general impression should be corrected that low voltage circuits need no precaution. "A time has come when it is important to give wide publicity to the possible dangers. The sale of poorly insulated electrical devices for the home should be prohibited." A bibliography of recent articles follows.—Orthello R. Langworthy and William B. Kouwenhoven, *Am. J. Hyg.*, 16, 3:625-665 (Nov.), 1932. E. R. H.

# Risk of Persons in Familial Contact with Pulmonary Tuberculosis\*

W. H. FROST, M.D., F.A.P.H.A.

*Department of Epidemiology, School of Hygiene and Public Health,  
The Johns Hopkins University, Baltimore, Md.*

DURING the past 2 years various workers in this department have collaborated in two epidemiological studies of tuberculosis; one concerned with the families of children registered in Dr. Edwards A. Park's clinic for tuberculous children at the Johns Hopkins Hospital; the other a series of studies carried on by a special unit of the State Department of Health of Tennessee in various localities in that state. The several studies have varied in scope and in certain details of method, but a purpose common to all of them has been to ascertain the mortality and specific morbidity in familial contacts of persons suffering from pulmonary tuberculosis, for comparison with the experience of suitable control populations.

The data so far accumulated are not sufficient to be of much significance as actual measures of even the gross average risks. They are sufficient, however, to afford material for preliminary investigation of the antecedent question whether records of the kind represented are at all suitable for the purpose in view. It is to this question that the present discussion is directed, the actual records of a small group of families being introduced only for purposes of illustration.

For the acute communicable diseases, such as diphtheria, scarlet fever, and measles, measurement of the morbidity risk of familial contacts is a simple procedure, because the excess risk is concentrated within the few weeks following invasion of the household. As was pointed out by Chapin years ago, all that is necessary is to ascertain, in each invaded household, the number of persons present, other than the one first attacked, with particulars as to sex, age, and many other variables which are to be considered; then to ascertain the number of cases of the same disease subsequently occurring in the various exposed groups within a stated period of, say, 4 to 6 weeks. This attack rate may then be compared with the average rate in the community at large for a like period of time. Collection of the data is simple because, for any family, the required period of observation is brief; and compilation is simple because the period to which the attack rate refers may be taken as the same for all families.

For tuberculosis the requirements are essentially the same, but are more difficult to meet, chiefly because the disease is of slow evolution, and we cannot assume that the risk with which we are concerned is concentrated within the year or even the decade following establishment of the known exposure. It may, perhaps, be manifested by excessive morbidity or mortality in any

---

\* Read before the Epidemiology Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

subsequent period of life. Hence, observation of the exposed group must extend over a sufficient number of years to define the rates of morbidity and mortality prevailing in successive periods throughout the usual span of life. To keep a sufficiently large group of people under systematic, exact observation for such length of time is a difficult task which has, indeed, been undertaken in various places, but to the best of my knowledge has not been carried much beyond a decade. However, such simple facts as lie within the knowledge and memory of the average householder may be obtained by *retrospective* investigation, tracing familial histories backward into the past. The procedures followed in a preliminary attempt to apply data collected in this way and to check their reliability may be described best by referring to a concrete example.\*

The available records which best serve the purpose of illustration are from a survey of the negro population of Kingsport, Tenn., made during 1930 and 1931 by a special unit of the Tennessee State Department of Health.†

The survey covered 132 families, constituting practically the entire negro population of the city.‡ For each family the investigation included a detailed familial history, extending as far back as practicable, and examination of every present member in a special clinic, where the routine procedure was: physical examination, roentgenogram of the chest, and tuberculin test. With very few exceptions, the full schedule

of examinations was carried out for all persons, regardless of whether or not there was any reason to suspect tuberculosis.

In addition to numerous other items which do not come into the present discussion, each family schedule gave the following:

1. Date of establishment of the household, which may be defined more exactly as the date when the present head of the household came into that position. This is an important item, as it marks the date from which at least one informant may be expected to have first-hand knowledge of occurrences within the household.

2. A list, by name, of all persons present in the household when the schedule was made out, giving, for each person: familial relationship, date of entrance into household, age at time of investigation, record of any present or past illness diagnosed as certain or probable tuberculosis, record of clinic examination, and a detailed account as to time and circumstances of any known household contact with antecedent cases of pulmonary tuberculosis.

3. A list, by name, of all former members of the household, giving, for each: age at which entered the household, record of known or suspected tuberculosis while in the household, record of household contact with antecedent cases of phthisis; age at which withdrawn from the household, status when withdrawn—whether living or dead—and, if dead, date of death, with ascribed cause.

These records were made with great care, each family being revisited as often as necessary to check and complete the information; and as the families were thoroughly coöperative, it is believed that the facts within their knowledge were stated with fair accuracy. From the histories obtained, it is probable that the deaths ascribed to pulmonary tuberculosis actually were due to that cause; but it is by no means certain that these were all the deaths attributable to tuberculosis, and as to non-fatal cases of this disease the histories, both negative and positive, obviously are subject to considerable error. Also, the *early* history of *former* members, who were born outside of the households in which they were recorded,

\* The procedure, except in collection of data, would be essentially the same in analysis of records obtained by keeping a group under planned observation.

† It is expected that a detailed report of the studies in Kingsport will be made from the State Department of Health of Tennessee.

‡ The federal census of 1930 gives the negro population of Kingsport as 596. The persons living and present in the families surveyed numbered 556. Only 3 families are known to have been omitted (because of unwillingness to be examined), but it is probable that a few others may have been missed.

must often be unknown. However, in general, the facts are simple and, for the period since establishment of each household, presumably within the knowledge of the informant.

The whole group of 132 families furnished records of 794 present and former members, classified as follows:

(1) Living and present at time of survey	556
(2) Former members of same households, not present at time of survey	
(a) removed, living	142
(b) dead, (27 of tbc., 69 of other causes)	96
	238
Total: present and former members	794

Before discussing mortality and morbidity from tuberculosis as related to history of known household contact with the disease, it is desirable, as a description of method and a check of the data, to compare the mortality from all causes in the entire group with the current mortality in the negro population of the state as a whole. The force of mortality in the population of the state is expressed in terms of the annual death rate, that is, the ratio of deaths to persons under observation for

a period of 1 year and, since this rate varies widely with age, it is necessary for significant comparisons that it be stated separately for each age group. We need, therefore, to reduce the mortality of the Kingsport families to these same terms, namely, age-specific annual death rates. To accomplish this, it is necessary to convert the observations on the family group to terms of life-experience, of which the unit is 1 person under observation for 1 year, or 1 person-year. The procedure to this end, which is an application of the familiar principles of life-table construction, is illustrated in Table I, which shows in detail the summation of life-experience within the age-limits 0-5 years.

As indicated in this table, 363 children, born in the families to which they are allocated, came under observation at the beginning of the first year of life. Of these, 18 died within their first year, and 15 others were less than 1 year old when the record was taken, so that a total of  $18 + 15 = 33$  were withdrawn from observation before completing the year. Counting each person withdrawn before the end of the year as having been in the household  $\frac{1}{2}$  year, we have as the aggregate

TABLE I

SUMMATION OF LIFE-EXPERIENCE AND MORTALITY BETWEEN THE AGE-LIMITS 0-5 YEARS IN 132 NEGRO FAMILIES

Year of Age	Number present at beginning of year	Number added during year	Number withdrawn (living) during year	Number dying during year	Mean number present during year	Death rate per 1,000 during year
$x$ to $x+1$	$l_x$	$n_x$	$w_x$	$d_x$	$L_x$	$m_x$
0-1	363	0	15	18	346.5	51.9
1-2	330	3	3	4	328.0	12.2
2-3	326	3	16	6	316.5	19.0
3-4	307	4	12	0	303.0	....
4-5	299	5	14	3	293.0	10.2

The derivatives from the primary figures ( $l_x$ ,  $n_x$ ,  $w_x$ ,  $d_x$ ) are:

$$l_{x+1} = l_x + n_x - w_x - d_x.$$
$$L_x = l_x + \frac{1}{2} (n_x - w_x - d_x).$$
$$m_x = 1000 \cdot \frac{d_x}{L_x}$$

TABLE II

MORTALITY FROM ALL CAUSES, BY AGE, IN NEGRO FAMILIES OF KINGSFORT, FROM DATE OF ESTABLISHMENT OF EACH FAMILY TO DATE OF EXAMINATION, AND MORTALITY RATES IN NEGRO POPULATION OF STATE, 1920

Age	Negro families of Kingsport			Negro population of Tennessee.
	Person-years of life-experience	Deaths, all causes	Annual Death rates per 1,000	Death rates per 1,000, 1920 *
Under 1	346.5	18	51.9	120.0
1-4	1,240.5	13	10.5	14.0
5-9	1,259.0	7	5.6	4.0
10-19	1,916.5	17	8.9	7.1
20-29	2,190.5	15	6.8	15.0
30-39	1,557.5	13	8.3	17.0
40-49	764.5	1	1.3	17.4
50-59	308.5	8	25.9	26.1
60+	88.0	4	45.5	67.0
Total	9671.5	96	9.9	18.0

\* From U. S. Mortality Statistics, 1920.

of life experience between the age-limits 0-1 year,  $363 - 33/2 = 346.5$  person-years.

In the second year of life, we begin with 330 ( $363 - 33$ ) children remaining under observation from the preceding year; and during the year 3 new children are added, while 7 are withdrawn. Allowing  $\frac{1}{2}$  year as the mean time spent in the household for each newly added person and each one withdrawn, the total life-experience in the second year, between the age-limits 1-2

years, is  $330 + \frac{3-7}{2} = 328$ .

In the same way, taking account of all additions and withdrawals, the life-experience in each successive year is summed up, until we have entered in the table a total of 378 individuals—the 363 present at birth plus 15 added at various times—of whom 91 have been withdrawn before reaching the age of 5 years, 31 by death and 60 for other reasons. In terms of person-years, where the unit is 1 person observed for 1 year, the aggregate life-experience between the age limits 0-5 years, is the sum of the five  $L_x$  values in the table, namely, 1,587 person-years. Within

this experience 31 deaths occurred, hence the *annual* death rate between the age-limits 0-5 years is:  $31/1,587 \times 1,000 = 19.5$  per 1,000.

Table II, constructed by continuation of the process illustrated in Table I, shows the entire-life experience of the 794 present and former members of the 132 families at successive ages from infancy to old age. The aggregate is 9,671.5 person-years; and in each age class except the oldest, the experience comprises several hundred person-years. Opposite each age-group are set the deaths which occurred at that age, and the next column gives the annual death rate per 1,000 in the age class, calculated as the ratio of deaths to person-years. The last column shows, for comparison, the annual death rates at corresponding ages in the negro population of the state in 1920.

The death rates in the Kingsport families are approximately equal to those in the negro population of the whole state in the age group 1-19 years, and at ages over 50, but are very much below the state experience in the first year of life, and in adults aged 20-49 years. The low infant mortality in the Kingsport families is probably

TABLE III

MORBIDITY AND MORTALITY FROM TUBERCULOSIS IN NEGRO FAMILIES, KINGSPORT, BY AGE, TOGETHER WITH MORTALITY IN THE NEGRO POPULATION OF THE STATE, 1920

Age periods	Life-experience Kingsport families person-years	Cases of tuberculosis †		Deaths from tuberculosis		
		Number	Attack rate per 1,000	Kingsport families		Negro population of State rate per 1,000*
				Number	Rate per 1,000	
Under 1	346.5	2	5.8	1	2.9	2.8
1-4	1,240.5	2	1.6	1	0.8	1.1
5-9	1,259.0	5	4.0	2	1.6	0.7
10-19	1,916.5	19	9.9	8	4.2	2.2
20-29	2,190.5	17	7.8	7	3.2	5.8
30-39	1,557.5	18	11.6	4	2.6	4.0
40-49	764.5	6	7.8	1	1.3	2.8
50-59	308.5	4	13.0	2	6.5	3.0
60 & over	88.0	4	45.5	1	11.4	3.7
All ages	9,671.5	77	8.0	27	2.8	3.1

\* From U. S. Mortality Statistics, 1920.

† Cases classed as "suspected" make up about one-third of the total.

due in part to the fact that the standard of living of the negroes in that city was well above the average; but it may be attributable in part to failure of informants to note some of the deaths of infants at very early ages, this being an error not unlikely to occur. The low mortality in adults aged 20-50 can hardly be attributable to any similar error. It more probably reflects the selective character of the life-table experience, which, being made up from the records of persons residing in established families, largely excludes certain classes of young adults suffering excessive mortality, namely, married couples of which both members have died young, residents of institutions, vagrants, and transients. With due regard to these considerations and to the small number observed, the agreement between the Kingsport mortality record and state-wide experience is close enough to indicate that the familial records are not grossly erroneous. At the same time, it needs to be clearly recognized that in certain important respects the method employed is selective with respect to mortality.

The 132 families furnished records of 27 deaths ascribed to tuberculosis. In addition to these, the clinic examinations revealed 50 more or less definitely diagnosed cases of pulmonary tuberculosis in living members of the families, making a total of 77 cases living and dead.\* Distributing these 77 cases according to age at onset of illness—as nearly as this could be ascertained—and distributing the fatal cases according to age at death, age-specific annual morbidity and mortality rates are derived as shown in Table III, which also shows corresponding death rates in the negro population of the state. It will be observed that the tuberculosis mortality rates are very similar to those prevailing in the state at large, and that the morbidity rates, though much higher than usually shown in official records, are reasonable in relation to the mortality.

The foregoing tables of mortality and

\* A majority of the 50 cases recorded in living members were judged to be inactive at the time of examination, and of these a considerable proportion were classed as "suspected." A reexamination of the suspected cases, which is now in progress, indicates that some 10 to 15 of this group may eventually be classified as negative, making a proportionate reduction in the morbidity rates of Tables III and IV.



morbidity in the whole group of families have been included only to illustrate the data and methods used and to check the reasonableness of the results (as to mortality), by comparison with current experience in the negro population of the state at large. We come now to the question of morbidity and mortality in familial contacts of known cases of tuberculosis.

came into household exposure subsequent to entry into the family.

When the population is thus subdivided, the numbers upon which age-specific rates must be calculated become so small that for significant comparisons it is necessary to summarize the results. For this the most convenient form is a statement of annual morbidity and mortality rates at all ages, adjusted to a

TABLE IV

MORBIDITY AND MORTALITY IN RELATION TO HISTORY OF FAMILIAL CONTACT WITH PULMONARY TUBERCULOSIS. NEGRO POPULATION, KINGSPORT, TENN.

<i>Basis of Comparison</i>	<i>Contact history</i>	
	<i>Positive</i>	<i>Negative</i>
Person-years in classification	2,199	7,472.5
Cases of tuberculosis: number	26	51
annual attack rate per 1,000	$12.9 \pm 1.7$	$6.8 \pm 0.64$
Deaths from tuberculosis: number	10	17
annual death rate per 1,000	$4.6 \pm 1.01$	$2.3 \pm 0.38$
Deaths, all causes: number	28	68
annual rate per 1,000	$12.8 \pm 1.62$	$9.2 \pm 0.67$

All morbidity and mortality rates adjusted to age-distribution of the entire life-experience in the whole group of 132 families.

Of the 794 persons included in the study, 299 gave a history of having been, at some time, in household contact with a case of certain or probable pulmonary tuberculosis. The mortality and morbidity rates in these known "contacts" subsequent to their exposure have been calculated by making up a life-table in which each contact is entered only for that period of his residence in the family after the known household exposure began, recording against this experience the subsequently observed mortality and morbidity.\* As a control, a similar table has been made, dating from entry into the household, for all persons who gave no history of known household contact, plus the preëxposure experience of those who

population of standard age-distribution. The comparisons made on this basis, in Table IV, indicate that the persons with a positive history of household contact suffered thereafter tuberculosis morbidity and mortality rates about double those of the control population, and in addition, suffered a materially higher mortality from other causes.

The figures given in Table IV show only the *average* morbidity and mortality risk for all familial contacts in this group of families, as measured by comparing their morbidity and mortality rates with those of a control drawn from the same universe. Given sufficiently extensive and exact data, it would be quite possible, by similar processes, to measure the variations in this risk as related to numerous circumstances which presumably are of importance, as, for instance, the age at which exposure first took place, its

\* Where the known exposure occurred before entrance of the individual into the household in which he is listed, the post-contact life-experience is dated from entry into present household.

duration, the activity of the case to which the individual was exposed, parental history, etc. The number of persons included in this particular set of records is too small for such subdivisions as these more detailed studies would require and, indeed, is so small that no special significance should be attached to the result given as a measure even of the average risk to contacts in negro families. It is, however, of interest to note that the relative rates of mortality in the contact and control groups, respectively, are in reasonable agreement with the observations of Weinberg (1913, pp. 123-129) who, in his extensive study found that the children of tuberculous parents suffered rates of mortality (at ages under 20 years) from all causes about 1.28 times and from tuberculosis about 2.16 times the rates prevailing in the community at large.

It should perhaps be added, though it is sufficiently obvious, that in the procedure applied here, no attempt is made to distinguish between the risk resulting directly from exposure and that which may be due to constitutional weakness or generally unfavorable environment. These questions may be approached by the same general method, but require much more extensive data.

The method which has been described is in no sense new in its appli-

cation to studies of tuberculosis. It has been used by Elderton and Perry, in their studies of the mortality of persons treated in sanatoria; by Weinberg, in his excellent and extensive study of the mortality of children born of tuberculous parents; and by others. It appears, however, to have been applied little, if at all, to retrospective records of the kind here discussed; and since it is records of this character which are most readily available from the experience of public health organizations and clinics, it has appeared worth while to call attention to this general method for the study of material which at present too often remains unassembled.

#### REFERENCES

- Elderton, W. P. and Perry, S. J. *Studies in national deterioration. VI. A third study of the statistics of pulmonary tuberculosis, etc.* Drapers' Company research memoirs, Cambridge Univ. Press, London, 1910.
- Studies in national deterioration. VIII. A fourth study of the statistics of pulmonary tuberculosis, etc. ibid.*, 1913.
- Weinberg, Wilhelm. *Die Kinder der Tuberkulösen.* S. Hirzel, Leipzig, 1913.

NOTE: For the original records of this study, I am indebted to Dr. E. L. Bishop, Commissioner of Health of Tennessee, and to Drs. William D. Hickerson, Virginia Hickerson, J. C. Ellington, and J. M. Bent, constituting the field staff of the study unit. For the compilations shown, I am indebted to Dr. James A. Crabtree, of the Tennessee State Department of Health, and formerly of the staff of this school.

# Medical Examination of Domestic Servants\*

CHARLES V. CRASTER, M.D., D.P.H., F.A.P.H.A.  
*Health Officer, Newark, N. J.*

IN modern government the state has assumed the responsibility for the care of the indigent sick and has broadened many curative activities into real preventive measures. Thus we do not wait for epidemics to develop as a result of sewage contamination of our water supplies, or for cases of food poisoning to result from sophisticated or adulterated foods. The requiring of clean water, milk, and food supplies is as much a preventive activity as are the definitely preventive measures against diseases by inoculation or vaccination. It is such efforts to promote health that have called for the extension of safety devices into wider and wider channels of governmental control.

It required the wide public interest of the "Typhoid Mary" story to show the danger to individual households of an undetected typhoid carrier employed as a cook. The result of this publicity was the adoption by the New York Health Department of a requirement for the medical examination of food handlers. Dr. Louis I. Harris, the Health Commissioner, after 2 years' experience, made the following significant statement:

It is only a beginning, but one whose significance and ultimate possibilities may well be called impressive. The manifold benefits that may ultimately accrue from this system

must be left to the imagination of those who have glimpsed the possibilities of preventive medicine and especially of adult hygiene and periodical medical examination.

## EXAMINATION OF FOOD HANDLERS STARTED IN 1920

This work, so well begun in New York, was adopted by Newark, N. J., in the middle of 1920, and since that time 150,000 examinations of food handlers have been made. The conditions encountered were tuberculosis, venereal disease, skin diseases, and various purulent conditions of the mouth, ear, and nose. During the 11 years the examinations have been carried on by the Newark Department of Health, there has been little or no opposition by the owners of restaurants and eating places, and we have received the full coöperation of the various labor unions. Even among the employees themselves it is not considered a hardship. The law acts as a bar to the employment of the sick and diseased, who would compete by accepting lower wages and longer hours.

Although the findings of the examinations for 11 years in Newark indicate that contagion is not more prevalent among the food handlers than any other body of industrial workers, the evidence gathered in the first few years showed that many were being employed when in the infective stages of tuberculosis. That this condition has been entirely

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

eliminated is due undoubtedly to the semi-annual examination of food handlers. Skin diseases are rarely found among applicants; venereal diseases in the contagious state are frequently found.

There was observed even in the first few months of the procedure a remarkable improvement in the general appearance of food handlers. There was a more wide-awake and intelligent appearance in all of them, due evidently to the elimination of the cheap labor of diseased persons previously engaged in other occupations who had sought the lighter and more elastic hours of restaurants and lunch counters. This is particularly important among the food-handling class for the reason that many are part-time workers, frequently recruited from married women and mothers of families who have some part of the day at their disposal.

#### SINCE 1930 DOMESTIC EMPLOYEES HAVE BEEN EXAMINED

The situation with regard to food handlers being adequately taken care of, the attention of the department was directed to the number of domestic employees attending the various clinics of the City Dispensary. Many of these were listed as tuberculous; others as suffering from venereal diseases in various stages of infectivity. The domestic servant by the nature of his or her employment was considered to be even more directly in contact with the family circle of the householder than the restaurant food handler. Some of them, such as nurse maids, take care of very young children, and their freedom from contagious disease is a matter of supreme importance. Others, such as cooks, waitresses, maids, laundresses, and chauffeurs, have not so direct contact with individuals, but none the less it is important to the family that no contagious diseases should exist among them.

#### TYPE OF EXAMINATION

The ordinance requiring the medical examination of domestic employees was passed in September, 1930. It requires all domestic employees to file with the Department of Health a certificate from a duly licensed physician setting forth that such persons are free from tuberculosis, and any other contagious or communicable disease. The certificate has to be made upon blanks supplied by the department, and is good for a period of 6 months. Provision was made for a free examination at the department clinics. After the examination a domestic servant's card is issued bearing a photograph of the applicant. The penalty for failure to comply is a fine of \$25 for the first offense and \$50 for the second. Both the domestic and the employer are liable under the law for any violation of the ordinance.

The number of domestics employed in Newark, according to the U. S. Census for 1930, was: males, 3,864; females, 9,674; total, 13,538. The group included under hotel and restaurant help are food handlers generally and are not purely domestic in nature. It was considered that the census figures overstated considerably at this time the number of individuals employed in the domestic group. This was verified by a house-to-house canvass of the residential districts, where it was found that owing to the business depression families were either doing without domestic help or had considerably reduced the number of servants employed.

The enforcement of the domestic servants ordinance was placed in the division of sanitation. The actual examinations are conducted in the dispensary clinics under the supervision of the bureau of tuberculosis. The form of examination carried out is similar to that for food handlers, and includes examination of the skin to detect diseases such as eczema, psoriasis, abscesses, cuts and wounds. The at-

tention of the examiner is directed to the possible association of skin diseases with syphilis. When such is suspected, a Wassermann blood test is required.

The examination of the chest must include all known procedures for the determination of chronic pulmonary diseases. Any abnormal chest condition found is sufficient cause for rejecting the applicant pending X-ray or fluoroscopic examination.

The examination of the nose, mouth, teeth, throat, ears, and eyes is directed toward the discovery of acute or chronic conditions of an infectious nature. Especially where there is a discharge, swabs are taken for examination.

Blood tests are required where there is a history of typhoid fever or syphilis. When there is no scar, vaccination against smallpox is required.

In the examination for venereal disease in the case of males a routine inspection of the sexual organs is required. Where suspicious sores or discharges are present, swabs are taken for dark-field examination and blood for a Wassermann. For women, there is required a statement from each applicant of freedom from venereal disease.

#### DOMESTIC EMPLOYEE'S CARD

After examination the applicant, if approved, takes the history card to the sanitary division, where a domestic servant card is issued bearing a photograph of the individual. Where there is doubt as to diagnosis for any reason whatsoever, the applicant is given a reexamination slip and a temporary card. This is usually for a week or a month. When an applicant is rejected the physician notifies the sanitary division, which in turn notifies the employer and employee in writing. The cause for the rejection is never given to the employer.

As is the case with all new laws, a considerable amount of education and publicity was required. All employ-

ment agencies, public and private, were brought into the department for a conference. The new ordinance was explained and it was pointed out that no domestic employee should be placed in any position without possessing the domestic employee's card. Local newspapers carried copies of the new ordinance displayed above help wanted advertisements. Domestics advertising for places were mailed copies of the law with instructions for examination. All hotels, clubs, lodging houses, and institutions were canvassed and their domestics sent down for examination. A house-to-house canvass was carried out in the residential districts and all householders were duly informed of the new ordinance.

During the year 1931 the law was not generally known to the public and the follow-up system had not been sufficiently organized. More definite efforts in the early part of 1932 produced better results. The number of examinations to date follows. It will be observed that there were over 10,000 examinations during first 8 months this year compared to 2,863 during 1931.

#### EXAMINATIONS

	<i>Private Doctors</i>	<i>At Our Clinic</i>	<i>Total</i>
1931	291	2,572	2,863
8 Months, 1932	1,282	8,879	10,161

#### INFECTIONS FOUND

As a result of clinical examinations and a check-up of domestics attending the venereal disease clinics the following figures were obtained: syphilis in all forms 115, positive Wassermann 52, negative Wassermans 63. Among the group found infected with syphilis 66 were day workers, the remainder domestics in various lines of employment.

There were 39 cases of skin diseases reported. These included impetigo, scabies, seborrhea, acne vulgaris, psoriasis, and purpura.

Among the 34 cases of tuberculosis found 14 discontinued work, 8 moved and could not be traced, 5 were sent to sanatoria, 4 in arrested stage were allowed to work, 1 died, 1 worked outside the city, 1 left for his home in the South; 25 were colored and 9 white.

The Newark ordinance did not specify that the domestic suffering from a contagious disease had to be in the communicable stage to be excluded from employment. It is assumed, however, that this was the intent of the ordinance, and therefore domestics with arrested tuberculosis or with venereal disease in a non-communicable form are allowed to continue in their occupation. With regard to those with diseases in the communicable state, the applicant is refused permission to continue in employment and the employer so informed. The department follows up all applicants who have been found infected, to see that proper treatment is being carried out. By the city ordinance we cannot divulge the nature of the disease to the employer. This is better for the self respect of the domestic and insures greater effort in bringing about proper and continuous treatment.

#### A PRACTICAL METHOD OF SAFEGUARDING THE FAMILY

I am asked repeatedly, "Is the examination of food handlers and domestics possible for small communities in the light of the cost for specialized service?" The answer will depend upon whether a complete medical examination is contemplated, as in

the case of life insurance companies, or an examination for contagiousness only. If the latter, the necessary examination is not so extensive and can readily be carried out by a well equipped physician in a few minutes for each applicant. Blood tests and X-ray work will require of course longer.

Routine Wassermanns and X-ray examinations are not made as yet unless symptoms indicate their necessity. Among certain groups of domestics, such as the day workers, the taking of a routine blood test might be of advantage. In fact, we are to start making Kline tests in certain groups of domestics within a few weeks, as our Law Department is of the opinion that it is satisfactory, providing applicant signs a routine permission form. The same may be said of the need for a mental or intelligence test. This might be a good procedure for those in charge of babies and children when quick thinking is sometimes a necessity to avoid accidents or the doing of things that might be hazardous to the lives of little ones. From the venereal disease standpoint, vaginal smears are to be taken from this particular group of baby nursemaids.

From the viewpoint of preventive medicine, there can be little doubt that the examination of food handlers has served as a useful and continuous aid in our campaign for cleaner foods. Its extension to domestic employees seems a well worthwhile activity, having as its object the exclusion from the homes of our people of those with contagious diseases.

# Sunlight and Health\*

HAVEN EMERSON, M.D., F.A.P.H.A. (*Life Member*)

*Professor of Public Health Practice, Columbia University, New York, N. Y.*

THE heretic Pharaoh Akhnaton, about 3,290 years ago, insisted that there was only one God, one source of all goodness and life, the Sun. He has had many successors and he was doubtless preceded by religious worshippers of light or heat from the Sun. His disciples are found among the heliotherapists today and it behooves us to speak cautiously when in the presence of such enthusiasts.

We know that sunlight was used in the treatment of disease by Hippocrates at Cos, and by the Priests of Aesculapius at Epidaurus. The interest of modern medicine with the use of light in treating disease began seriously with the work of Finsen in 1893, who cured lupus by localizing the light rays of the sun, after filtering out the heat rays. It is by raising the local and general resistance, not by destroying the tubercle bacillus in the skin that ultra-violet rays cure lupus. Ten years later (1903), Rollier started his sunlight treatment of surgical tuberculosis in Switzerland.

The relation of the lack of sunlight to the etiology of disease was first described by Palm, an English physician, in 1890, when he attributed rickets to insufficient sunlight, noted the seasonal incidence of the disease, and described its prevention and treatment by the use of sunlight.

An abundant literature has developed on the known and imagined relationships between sunlight and health and mortality, and the therapeutic application of part or all of the radiant energy of the sun in preventing and treating symptoms and persons.

As a factor in the environment of man, of the deepest and probably, biologically speaking, most ancient significance, sunlight as the indispensable cause of the growth of green plants, and as a condition without which man cannot retain health or continuously reproduce his kind has an importance which increases steadily with man's persistent complication of housing in the interest of his physical comfort and convenience.

May I assume that you are at the moment less concerned with light as a resource in the treatment of disease, than in evidence or accepted opinion as to the preventable conditions resulting from too much, or not enough, sunlight.

Excess of sunlight is known to cause two types of disturbance, physical lassitude, and nervous irritability, the former apparently due to the heat, the latter to the light radiations particularly. Insolation or "sunstroke" may be produced by excessive heat in the absence of sunlight.

In southern Arabia, in our own deserts, and in the tropics of several continents, man's survival has always depended upon his sheltering himself from the heat of the sun, even when his skin is by adaptation capable of pro-

\* Read at a Joint Session of the Public Health Engineering and Industrial Hygiene Sections of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

tecting him against the over-stimulation of the light rays. In temperate climates, the injudicious sudden or extreme exposure of white skinned persons, especially of children and thin blond persons, to midsummer sun, even when not to a degree to cause sunburn or to damage from heat, not uncommonly causes irritability, sleeplessness, loss of weight, and a variety of nervous phenomena of similar character. Snow blindness from excess of ultra-violet light and its reflection may follow excessive exposure to sunlight in high altitudes in any climatic belt.

In the treatment of surgical tuberculosis in white skinned people the benefit seems to be in proportion to the pigmentation of exposed skin.

Insufficient sunlight, which we can fairly assume need not, or does not, occur ordinarily in the tropics, but is common at part or all times of the year in temperate or polar regions, is responsible for only one clearly defined clinical entity, rickets.

The cause of rickets in its full complexity is not yet known, but it appears that the growing child from the antenatal period to the age of 2 to 3 years cannot accomplish sound development of bone unless the calcium and phosphorus metabolism has the benefit of the stimulation which sunlight gives to the ergosterol in the skin cells.

The small amount of ultra-violet radiations that penetrates the ozone of our atmosphere is apparently indispensable to the normal development of bone of man and other mammals, unless its equivalent is artificially supplied by other means (cod liver oil, radiated oils, egg yolks, etc.).

Nothing is plainer in the morbidity and mortality experience of our northern cities than that the presence of rickets contributes heavily to sickness and death from bronchitis and pneumonia in young children, to lowered resistance to measles, whooping cough,

and tuberculosis, and more remotely, by reason of pelvic deformities, to maternal deaths from difficult, instrumental, or operative deliveries. A further serious by-product of rickets is the disturbance of dentition, and a greater susceptibility to caries and malocclusion of the jaws. Spasmodophilia is another condition closely related to rickets and due to insufficient sunlight for healthy infancy. It is to be remembered that rickets is a general metabolic disorder affecting other tissues than the growing ends of the bones, particularly the voluntary musculature and the blood.

It may well be that the growth and development of children and adults suffers disadvantage from insufficient sunshine or skyshine in other still unrecognized ways, but at least there is no other disease entity now described which is believed to be due to such insufficiency. Wise feeding alone will not prevent rickets in the absence of sunlight unless a substitute for solar radiation is added. The same action that determines the prevention of rickets is seen to act in assisting the repair of bone, whether this be in the callus of a fracture or in a bone diseased with tuberculosis.

There are psychological values in sunshine well recognized in the treatment of disease, and particularly in the management of chronic and convalescent patients, and it may fairly be assumed that the delight in the presence of sunlight, indoors and out, from infancy to old age, which is quite universal, is based on physiological benefits, whether they be because of warmth, dryness, ease of work, wider range of pleasures, range of color and form to delight the eye, or the feeling of euphoria that mankind gets from having his place in the sun. Sunlight assists in the healing of wounds on the surface of the body, relieves some of the pain of damaged tissues, and im-



proves the bactericidal properties of the skin in and about the wound.

Apart from these subjective, personal, bodily and spiritual relations of sunlight to health there are the objective or environmental effects of sunlight upon which some of man's safety from his biological enemies depends.

Sunlight and skylight in proportion to their intensity and duration will sterilize surfaces exposed to them, and will even penetrate with bactericidal effect into the unbroken skin, only a fraction of a millimeter in the normal blood-filled tissue, but as far as 4.25 mm. into the skin made anemic by pressure.

This bactericidal effect, which is greatly reduced when radiations must pass through ordinary window glass obliquely into a room, is by a direct action on the cells, and not by the intermediate development of hydrogen peroxide or other chemical, and it is due to the photo-chemical capacity of the cell to absorb ultra-violet rays. In addition to this effect bacteria may be destroyed by the dehydration and oxidation caused by the heat rays of the sun.

Perhaps the most important problem of environment in city housing in northern climates is provision for sufficient light, direct or diffused, from sun or sky, to maintain reasonable sanitation of rooms and halls through the disinfectant property of light, which if not hindered by curtains and dirty glass will accomplish much to reduce viability and virulence of the common human pathogens.

Cloudiness, fog, smoke, or dusts, or combinations of these reduce radiant energy of sunlight below a point safe for the sanitation of the home or for the growth and development of infants. The main factor in determining the effectiveness of ultra-violet solar radiations in benefiting human health is the thickness and quality of the atmospheric

envelope and the angle of incidence of the rays. Sunlight is much less controllable for selective therapeutic effect than are artificial radiations under many urban conditions of climate, smoke, etc.

The long red and infra-red rays have effects upon the skin even when they are not appreciated by the eye as light. There has been recent suggestion offered by Leonard Hill of London to the effect that there are selective effects of some of these long infra-red rays coming from an open fire or incandescent gas heater or dark electric radiating heater plate which favorably affect the mucous membrane of the nose and throat by reducing turgescence, and tend to prevent colds. This suggestion will need much confirmation before it can be accepted. Light baths if carried with discretion to the point of erythema may increase general resistance to infection, an effect which can be produced also by heat of various origins, or by a mustard plaster.

There are 3 indices of measurement for therapeutic strength of ultra-violet rays: (a) lethal effect on infusoria; (b) erythema of the skin; (c) bleaching of a solution of acetone and methylene blue. This bleaching may be repeated as much as 41 times in a day in the Alps, although it may take place only once or twice in a day in England in the winter.

The total ultra-violet radiation from the sky exceeds that which comes directly from the sun. The sun at the zenith gives but 90 per cent of the total sky shine coming from blue sky.

Man's eyes suffer, and his effectiveness in near and far vision work is reduced when artificial light falls too far below the quantity and quality of sunlight. It is to sunlight that our eyes are biologically best adapted.

Studies have been made in an effort to support our physiological evidence of the benefit to health from sunlight, by

proof of correlation between lack of sunlight and higher sickness and death rates. There are so many complicating economic, social, educational, and racial factors involved in comparing neighborhood or district death rates, on a basis of the amount of soot-fall, or on the quantitative presence of ultra-violet rays, that unequivocal evidence as sought has not yet been found, although the opinion is widely held that dark, smoky, foggy local atmospheres actually do cause a rise of local death rates. Certainly in London the presence of serious fog always causes a rise in deaths from respiratory, circulatory, and infectious diseases, and from accidents.

When the air is dirty or smoky, cleanliness and window ventilation are discouraged, light is reduced, plant life is damaged, spirits are depressed, and vitality is lowered.

DEATH RATES PER 100,000 PERSONS OF BOTH SEXES, AGE 10-19, PER ANNUM, FROM ORGANIC HEART DISEASE, 1916-1921, INCLUSIVE

Boston	7.03	Chicago	6.19
New York	5.42	Detroit	4.76
Philadelphia	5.38	Cleveland	4.42
Richmond	2.88	Cincinnati	3.55
Atlanta	1.92	Birmingham	1.67

I am privileged to add here the provisional results of a study of the death rates from organic heart disease (rheumatic carditis) occurring in the age decade 10 to 19 years, in cities in this

country, according to latitude and smokiness of atmosphere, from an unpublished report from the Department of Sanitary Science at the College of Physicians and Surgeons of Columbia University.

As one follows the coast cities south from Boston to Atlanta he finds a falling organic heart disease death rate in those 10 to 19 years of age, from 7.03 per 100,000 per annum in Boston, to 1.92 in Atlanta.

Similarly in following soft-coal cities of the country from Chicago south to Birmingham, one finds a fall in the rate from 6.19 in Chicago to 1.67 in Birmingham.

Many factors, and possibly fallacies, need consideration before accepting this as evidence that the changes in these death rates are related to climatic differences in ultra-violet radiations, which may cause differences in the virus of rheumatic fever or variations in the resistance of youth to this infection.

We need studies of this kind. We need animal experimentation to supplement domestic and clinical observations, to supplement and correct our present convictions that sunlight, sunheat, and skylight have indispensable values to health and disease prevention which cannot safely be ignored, and for the preservation of which we are well justified in taking administrative action in the matters of housing and air purity, particularly in our northern cities.

# Health Problems Peculiar to the Southern States\*

JOHN A. FERRELL, M.D., DR.P.H., F.A.P.H.A. (*Life Member*)

*Associate Director of the International Health Division of the Rockefeller Foundation, New York, N. Y.*

THE region known as the "southern states," according to the boundaries established by the Southern Medical Association, embraces 16 states and one-third of the population of the United States. In 1930 the residents of this area numbered 40,761,751, of whom 30,513,518 (75.9 per cent) were white; 9,420,880 (23.1 per cent) colored; 702,988 (1.7 per cent) Mexican; 117,369 (0.3 per cent) Indian; and 7,356 (0.02 per cent) Japanese or other orientals. This vast region consisting of 945,028 square miles, or approximately 32 per cent of the total area of the United States, lies mainly in the north temperate zone, but the five gulf coast states lie partly in the subtropical zone. Because of the location and climate of this section and its commerce with tropical countries and air service from them, the inhabitants are more exposed to tropical diseases than are residents in the northern states.

The history of the South, especially in regard to settlement, the Civil War, and the Reconstruction Period, as well as its agriculture and its large negro population, has given rise to the opinion now commonly held that it is a distinct region, having common interests, advantages, and problems. The progress of public health in this region has been influenced by the development

of its political, educational, and social institutions, and by economic conditions. Prior to the Civil War, the general standard of living, except among the plantation owners, was low. The four years of Civil War and the subsequent years of misrule during the Reconstruction Period left the South prostrate and poverty stricken. The sickness and death rates were known to be high, but their exact levels were not uniformly recorded. During the last decade of the 19th century the South began to emerge into a new and brighter era. Leaders appeared to give guidance in bettering economic conditions, in improving agricultural methods, in developing the public school system, in building roads, and in furthering other progressive movements. Each of these advancements had a bearing on the public health, but as a distinct movement in itself, public health made very little, if any, progress until the 20th century was under way.

When the Rockefeller Sanitary Commission was organized in 1909 to combat hookworm disease in the South, the states of Maryland, North Carolina, Virginia, and Florida had recently appointed full-time state health officers, and such cities as Baltimore, Richmond, Savannah, and Jacksonville had developed health services creditable for that period. In general, however, the states, cities, and counties of the South, prior to 1910 did not have any real health service, although part-time

---

\* Presented before the Southern Branch American Public Health Association at Birmingham, Ala., November 14, 1932.

physicians may have been employed by state and local governments during epidemic outbreaks. The coöperation of the Rockefeller Sanitary Commission with the states of the South gave impetus to the health movement. The \$1,000,000 donation of Mr. Rockefeller to combat hookworm disease was expended in 12 southern states during the years 1910-1915. It made it possible for each state department of health to have from 4 to 6 full-time health officers with laboratory assistants who conducted clinics and educational work throughout the states. The accomplishments against hookworm disease and soil pollution made public health history and incidentally created a popular desire for a creditable and continuous health service. At the same time the state health departments were being organized and strengthened. Their work was placed on a full-time basis in practically all southern states and divisions for diagnostic laboratory service, communicable disease control, vital statistics, and sanitary engineering were created and financed by legislative action.

Beginning with the admission of Maryland into the U. S. Registration Area for deaths in 1906, followed by the admission of Kentucky and Missouri in 1911, and Virginia in 1913, the movement for the improvement of vital statistics records has finally brought into this area all the southern states except Texas. This state will no doubt be admitted in due course. The New England states, Michigan, Indiana, and the District of Columbia, which comprised the original registration area, had been admitted by 1900. Only in the past ten years or less, therefore, has it been possible to compare the general and specific causes of death in the southern states with similar records for other sections of the country.

While the state health organizations were gaining strength, full-time county

and city health departments were being developed in the southern states. In 1915, of the 14 full-time county health departments operating in the United States, 11 were located in the South: 1 in Kentucky, 2 in Alabama, 2 in Georgia, and 6 in North Carolina. At the close of 1931, of the 596 full-time county health organizations in 36 states, 451 were located in the 16 southern states, serving more than 17,000,000 inhabitants, or approximately 43 per cent of the total population of this section. The U. S. Public Health Service, the Rockefeller Foundation, and other extra-state health agencies supported this movement. Although in the South the health movement was slower in starting and was confronted with greater difficulties and more serious problems than in other sections of the country, it developed more rapidly there in the past 20 years than elsewhere in the United States.

Public health work, we are confident, has greatly improved the health status of the people of the South, but owing to lack of complete records, except for recent years, we cannot accurately determine the extent of the improvement. Table I compares the average death rates for 1929, the latest published figures, of whites and negroes separately for 34 causes of death in 14 southern states with the rates in 8 northern states. In the columns to the right are shown the comparative averages for 14 states. If the average death rate for the southern white population be regarded as "1" (see column A), then the rates for the southern colored population would be the figures in the second column, B, and those for the northern states the figures shown in the last column, C. A study of the table reveals that in the South the negro rates are markedly higher than the white rates for syphilis, homicide, gonococcal infections, and pellagra, and considerably higher for pulmonary and

TABLE I  
GROUP 1. DEATH RATES PER 100,000 POPULATION

Intn'l List No.	CAUSE	So. White		So. Col.		Northern		Comparative Averages		
		Aver- age	Vari- ation	Aver- age	Vari- ation	Aver- age	Vari- ation	"A" So. W.	"B" So. Col.	"C" North
1	Typhoid & paratyphoid	6.71	0.41	15.84	0.32	1.74	0.25	1	2.36	0.26
5	Malaria	9.98	0.90	21.05	0.85	0.19	1.52	1	2.11	0.02
7	Measles	2.06	0.67	1.31	0.70	2.59	0.50	1	0.63	1.30
8	Scarlet fever	2.03	0.43	0.44	1.26	2.21	0.46	1	0.22	1.09
9	Whooping cough	7.36	0.23	13.68	0.34	4.60	0.38	1	1.86	0.63
10	Diphtheria	9.06	0.29	5.65	0.30	6.12	0.46	1	0.62	0.68
11a	Influenza (Pulmonary)	49.12	0.33	60.48	0.55	24.76	0.38	1	1.23	0.50
11b	" (Other)	30.56	0.68	48.30	0.45	12.71	0.41	1	1.58	0.42
16	Dysentery	5.04	0.39	7.09	0.21	0.89	0.41	1	1.41	0.18
21	Erysipelas	2.06	0.22	0.85	0.65	2.74	0.19	1	0.42	1.33
22	Poliomyelitis	0.91	0.46	0.74	0.44	0.65	0.34	1	0.81	0.72
23	Lethargic encephalitis	0.91	0.55	0.43	1.10	1.35	0.31	1	0.48	1.49
24	Cerebrosp. meningitis	2.64	0.76	2.13	0.61	6.01	0.75	1	0.81	2.28
28	Rabies	0.12	0.64	0.05	2.48	0.05	1.00	1	0.45	0.41
29	Tetanus	1.41	0.40	3.42	0.58	0.75	0.33	1	2.42	0.53
31+	Tuberculosis (Pulm.)	52.87	0.31	155.37	0.23	64.62	0.18	1	2.94	1.22
	" (Other)	5.59	0.47	15.52	0.46	9.04	0.13	1	2.76	1.62
38	Syphilis	4.54	0.41	34.54	0.43	7.66	0.28	1	7.60	1.69
40	Gonococcal infection	0.64	0.53	2.79	0.69	0.82	0.31	1	4.35	1.28
54	Pellagra	11.61	0.71	39.47	0.60	0.28	0.79	1	3.40	0.02
60a	Exophthalmic goiter	1.58	0.64	1.38	0.72	4.25	0.46	1	0.87	2.69
66	Alcoholism	2.23	0.48	3.15	0.93	4.55	0.32	1	1.41	2.04
101a	Lobar pneumonia	36.78	0.28	63.09	0.46	49.82	0.20	1	1.72	1.36
165+	Suicide	11.35	0.26	2.93	0.45	16.81	0.24	1	0.26	1.48
197+	Homicide	7.96	0.27	38.54	0.39	6.10	0.36	1	4.84	0.77
175+	Accidents	69.66	0.12	84.87	0.18	85.62	0.11	1	1.22	1.23

GROUP 2. DEATH RATES PER 10,000 POPULATION AGED 45 AND OVER

43+	Cancer	32.02	0.20	27.95	0.23	45.74	0.08	1	0.87	1.43
57	Diabetes	5.90	0.22	5.61	0.22	8.91	0.17	1	0.95	1.51
72	Tabes dorsalis	0.44	0.37	0.35	0.62	0.58	0.17	1	0.80	1.30
74a	Cerebral hemorrhage	32.59	0.18	53.87	0.30	35.10	0.17	1	1.65	1.08
129	Chronic nephritis	40.97	0.25	69.35	0.26	34.09	0.22	1	1.69	0.83

GROUP 3. DEATH RATES PER 1,000 LIVE BIRTHS

113	Diarrh. and Enteritis under 2 years	10.21	0.23	15.82	0.33	7.38	0.29	1	1.55	0.72
143+	Puerperal causes	7.13	0.15	12.86	0.16	6.35	0.07	1	1.80	0.89
160+	Diseases of early infancy	25.96	0.11	30.54	0.26	26.68	0.08	1	1.18	1.03

Note: 14 Southern States: Ala., Ark., Fla., Ga., Ky., La., Md., Miss., Mo., N. C., Okla., S. C., Tenn., Va.  
8 Northern States: Calif., Ill., Mass., Mich., N. Y., Ohio, Pa., Wash.

Averages are the means of individual states' rates.

U. S. Bureau of Census figures for 1929—Table prepared by Hugo Muench, M.D., Statistician and Staff Member of (I. H. D.) Rockefeller Foundation.

other forms of tuberculosis, as well as for tetanus, typhoid and paratyphoid fever, malaria, whooping cough, and puerperal causes. The negro rate is markedly lower than that of the whites

of the South for scarlet fever, suicide, erysipelas, rabies, lethargic encephalitis; noticeably lower for measles and diphtheria, and lower to a less degree for tabes dorsalis, poliomyelitis, cerebro-

spinal meningitis, exophthalmic goiter, cancer, and diabetes.

The death rates for southern whites are markedly higher than those for the population of the northern group of states, for malaria, pellagra, dysentery, typhoid and paratyphoid fevers; considerably higher for rabies, influenza, tetanus, whooping cough, and diphtheria; and higher but to a less degree for poliomyelitis, diarrhea and enteritis in children under 2 years of age, homicide, chronic nephritis, and puerperal causes. The rates for the general population of the northern group of states are appreciably higher than those for the southern whites for exophthalmic goiter, cerebrospinal meningitis, and alcoholism; and higher but to a less degree for syphilis, tuberculosis, diabetes, lethargic encephalitis, suicide, cancer, lobar pneumonia, erysipelas, measles, tabes dorsalis, gonococcal infections, accident, scarlet fever, cerebral hemorrhage, and diseases of early infancy.

Although the North has its excessive death rate from exophthalmic goiter and cerebrospinal meningitis, the South has its excessive rates among whites from malaria, pellagra, and typhoid. In general, however, the death rates among the southern whites compare favorably with the rates in other parts of the country. The negro death rates are generally exceptionally high and as a result have raised the average rates for many causes of death for the South.

The rate of growth in public health expenditures has been more rapid in the South than elsewhere in the United States during the past 20 years. This is all the more striking when it is realized that the average per capita wealth in the southern states \* ranges from \$1,284 to \$3,196, and the average per capita income † from \$248 to \$653, as compared with 8 northern states (see Table I, footnote) for which the per

capita wealth \* ranges from \$2,880 to \$3,725, and the per capita income † from \$661 to \$1,158.

The growth in public health expenditures can be illustrated by the fact that the health appropriations in the 11 southern states originally aided by the Rockefeller Sanitary Commission had increased from \$225,395 in 1910 to \$3,845,580 in 1930, or 1,600 per cent. The legislatures of Alabama and Virginia each appropriated in 1930 more than twice as much money for public health work as did the 11 southern states combined in 1910.

The question naturally arises as to whether or not there has been a larger reduction of the death rates for controllable diseases in the South than in the North. If the answer should be based upon the percentage of reduction, the showing for the South in general would not be as favorable as for the North. The objection to a percentage basis is that it gives no idea as to the number of lives saved. For example, if a state has 3,000 deaths from a certain disease, it must reduce the number by 1,500 in order to have a 50 per cent reduction, whereas another state having only 4 deaths from the disease could, by a reduction of 2 deaths, show a 50 per cent reduction. A comparison based upon the change in the mortality rates indicates more accurately, we believe, the relative progress, because it reflects the number of lives saved. Table II compares the average mortality per 100,000 population for a 9-year period, 1921-1929, in 10 southern states, with the average change for the same period for either the original registration area, or the U. S. Registration Area. It will be noted that, with very few exceptions, the reductions in death rates in the 10 southern states exceed those in the

\* Figures are from *The National Market*, Crowell Publishing Co., 1926.

† Figures are for the year 1928 as published in the *World Almanac* (1931).

control areas for typhoid fever, malaria, and tuberculosis.

Aside from the influence of the negro on health problems in the South, there are, of course, certain important diseases that are peculiar to this region. One of these is hookworm disease. Through the intensive measures directed against this infection during the period 1910-1915, its prevalence and severity have diminished. The subsequent continuation of treatment and the intensive work in rural sanitation have further limited the disease, but there are still sections in the South where little has been done and where the clinical disease is still found. Formerly it was customary to make the diagnosis of hookworm disease when persons

were found to harbor hookworms, regardless of whether or not clinical symptoms were manifested. Furthermore, the assumption was that in the absence of adequate sanitary facilities, any person who deposited hookworm ova on the soil was a menace. In more recent years the students of this disease have made a distinction between infestations causing illness and those resulting in a carrier state only. Certain soils have been found to be unsuited to the development or survival of hookworm larvae. These developments have led to some misunderstanding as to the character and importance of the present residue of the disease in the South. As the disease is seldom given as the cause of death, it

TABLE II  
ANNUAL CHANGE IN MORTALITY PER 100,000 POPULATION, 1921-1929

State	Typhoid and Paratyph.	Malaria	Diphtheria	Tuberculosis (all forms)	Diarrhea and Enteritis under 2 yrs.*	Puerperal*	Infant Deaths*
Fla.	-1.32	+0.16	-0.39	-3.38	-2.69		
Ky.	-1.08	-0.14	-1.74	-4.05	-0.44	-0.03	+0.45
La.	-0.80	-1.48	+0.05	-4.63	-2.54		
Md.	-0.50	-0.02	-0.88	-4.19	-5.12	-0.07	-2.08
Miss.	-0.77	-2.55	-1.01	-2.18	-0.15	-0.02	+0.52
Mo.	-0.71	-0.15	-1.88	-2.36	-1.45		
N. C.	-0.76	-0.74	-0.75	-2.90	-3.44	+0.04	+0.50
S. C.	-0.68	-0.80	-0.22	-4.00	-1.81		
Tenn.	-1.23	-0.78	-0.71	-2.66	-0.61		
Va.	-1.07	-0.17	-1.40	-4.38	-2.88	+0.01	-0.25
O. R. S.	-0.41	-0.12	-1.27	-2.83			
U. S. R. A.					-2.56	+0.02	-1.25

\* Rate based on 1,000 live births.

Notes: This represents the average annual change in actual deaths per population, as obtained by fitting a trend line to the years in question.

O. R. S.—Original registration states, all in the North.

U. S. R. A.—Entire registration area, including southern states.

Table prepared by Hugo Muench, M.D., Statistician and Staff Member of (I. H. D.) Rockefeller Foundation.

is not possible to ascertain its exact status in any community, except by surveys involving the examination of samples of the population. Fortunately quite a number of such surveys have been made from time to time in typical counties, and as a rule they show that hookworm disease is gradually diminishing in prevalence and in severity. A number of surveys of Mississippi counties are being made this year.

Malaria in the past has been widespread in the United States, occurring in such states as New York, Ohio, Michigan, and Iowa; but with the clearing and cultivation of the land, and improved drainage, this disease has gradually receded southward, so that its prevalence now is limited essentially to the southern states. In towns and cities of this section it is, as a rule, under control, but in certain rural areas it is still a real health problem. Its prevalence varies from year to year with the amount and character of precipitation in the spring and summer months. The *Anopheles quadrimaculatus* is the only vector of malaria of importance in the South. The habits of this mosquito are better understood than formerly, likewise knowledge as to practical control measures is more definite than in the past, so that we are better prepared than formerly to combat the disease.

Pellagra, it will be noted from Table I, is practically absent from the northern group of states, but in the South the death rate for this disease among the whites is 11.61 per 100,000 population, and among the negroes, 39.47. Its occurrence generally seems to be associated with low standards of living, including a lack of certain essential foods. Through the researches of Goldberger of the U. S. Public Health Service and others, practical methods for combating the disease are now known, and in varying degrees are being

applied. In 1929, there were 6,621 deaths from pellagra in the registration area; 70 per cent of them occurred in 6 states—North Carolina, South Carolina, Georgia, Mississippi, Alabama, and Arkansas (Table III).

Typhoid fever is not peculiar to the South. Epidemics have occurred in recent years in northern states and in Canada, but from the standpoint of prevalence and death rate, the disease is far more a problem in the South than in the North. By reference to Table I, it will be noted that the typhoid death rate for the southern states among the whites is nearly 4 times that for the northern group of states, and among the colored population more than 9 times as great. Surveys made in recent years have shown that the greatest prevalence of typhoid in the South is in small towns which are not adequately sewered or otherwise sanitized. Typhoid surveys in the South were begun by the U. S. Public Health Service about 1911, while the hookworm campaign was under way. The forces engaged in activities against both diseases found common ground in the improvement of rural sanitation and in the establishment of full-time county health organizations. The building of sanitary toilets was the initial activity of many of the full-time county health departments that have been established in the South. It is interesting to note from Table II that the average reduction in typhoid for the past 9 years in each of the 10 states listed is somewhat greater than in the northern states composing the original registration area. The fact remains, however, as indicated by the rates for 1929 shown in Table I, that the disease is still a serious health problem in the South, demanding better methods for disposal of excreta, further improvement in water and milk supplies, and further protection against human carriers and flies and other insects which may carry the disease.



Tuberculosis presents a problem of great magnitude among the negroes in the southern states. As shown in Table I, the average death rate for pulmonary tuberculosis in 1929 among the colored population of the South was 155.37 per 100,000. In comparison with this, the average rate for all races

TABLE III  
NUMBER OF DEATHS FROM PELLAGRA

States	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Ala.	—	—	—	—	—	—	—	—	—	—	413	502	557	600	666
Ariz.	—	—	—	—	—	—	—	—	—	—	—	9	7	13	8
Ark.	—	—	—	—	—	—	—	—	—	—	—	—	655	633	515
Calif.	28	25	24	22	23	12	15	13	33	28	48	45	40	54	42
Col.	2	3	4	2	3	1	5	4	4	0	4	1	2	3	4
Conn.	1	1	5	4	5	1	1	0	2	2	2	1	1	2	4
Del.	—	—	—	—	0	0	0	0	0	0	0	0	0	1	0
Fla.	—	—	—	—	125	114	131	110	101	102	126	131	222	291	315
Ga.	—	—	—	—	—	—	—	498	437	334	—	—	—	859	878
Ida.	—	—	—	—	—	—	—	—	—	0	1	—	—	—	—
Ill.	—	—	—	26	17	11	9	8	5	7	10	19	31	40	16
Ind.	9	4	6	12	5	3	6	1	1	1	1	5	4	8	2
Ia.	—	—	—	—	—	—	—	—	3	0	2	5	2	1	2
Kan.	28	10	28	22	19	8	6	9	4	10	12	13	8	11	9
Ky.	149	124	197	147	111	65	65	73	68	58	88	144	160	178	133
La.	—	—	—	263	227	203	181	134	152	186	352	268	342	330	285
Me.	10	15	19	16	5	4	8	7	5	2	1	9	6	6	3
Md.	16	3	16	18	9	8	6	4	6	3	7	5	18	8	10
Mass.	25	40	19	21	14	11	13	9	11	12	10	11	10	11	11
Mich.	12	5	6	9	4	5	2	2	6	5	4	7	4	6	8
Minn.	1	2	0	4	2	1	0	2	3	1	2	2	3	2	5
Miss.	—	—	—	—	495	558	683	450	409	434	570	563	706	755	754
Mo.	34	41	59	56	25	25	20	14	12	16	21	29	29	36	27
Mont.	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
Neb.	—	—	—	—	—	1	1	1	2	0	2	1	0	3	3
Nev.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
N. H.	5	11	5	2	2	1	0	3	2	2	0	1	1	2	1
N. J.	5	4	2	2	4	1	2	4	2	3	5	2	5	5	2
N. M.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31
N. Y.	12	28	29	21	21	12	19	8	14	17	14	28	18	11	23
N. C.	347	485	620	696	400	318	338	330	239	381	382	455	671	851	950
Ohio	5	5	3	7	8	3	3	5	1	7	11	9	16	21	21
Okla.	—	—	—	—	—	—	—	—	—	—	—	—	—	238	279
Ore.	—	—	—	2	0	0	0	2	1	2	2	2	0	2	3
Pa.	6	4	5	7	6	4	6	5	8	9	19	7	24	14	15
R. I.	9	8	6	7	4	3	4	2	1	1	6	1	2	1	2
S. C.	—	729	714	741	401	306	367	427	332	336	435	563	772	999	943
Tenn.	—	—	750	676	435	302	329	273	298	263	384	530	604	521	412
Utah	0	0	0	0	1	0	0	1	0	0	2	0	1	1	0
Vt.	3	2	5	5	7	1	2	0	1	1	2	3	1	2	1
Va.	332	248	302	327	177	134	119	108	78	75	97	116	156	193	228
Wash.	2	0	2	0	1	0	1	2	0	1	2	0	1	1	0
W. Va.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5
Wis.	1	1	3	2	2	1	1	3	4	1	1	0	3	2	2
Wyo.	—	—	—	—	—	—	—	—	—	1	1	2	0	—	—

in 8 northern states was 64.62, and for the white race in the southern states 52.87. The status of the southern whites with regard to pulmonary tuberculosis would appear, therefore, to be more satisfactory than that of the general population in the North. The picture is markedly different for the negroes in the South, and this is true for all other forms of tuberculosis as well. That progress is being made in the suppression of tuberculosis is indicated in Table II. During the period between 1921 and 1929 the average annual change in mortality due to all forms of the disease has shown improvement, and this change has been more marked for a number of the southern states than for the states composing the original registration area. It is obvious, however, that much remains to be accomplished in the suppression of this disease among the negroes of the South and that the solution of the problem should continue to receive the most careful consideration of the public health workers of this region.

Dengue (Table IV), like hookworm disease, does not stand out in the mortality tables, but from time to time it becomes epidemic in the southern states, as in 1922 when it caused 548 deaths in nine southern states. The number of deaths does not reflect the widespread sickness and disability, the serious impairment of the physical efficiency of thousands, and the crippling of agriculture, industry, and commerce, that result from a dengue epidemic. As yellow fever is spread by the mosquito *Aedes aegypti*, which is also the vector of dengue, and as almost the entire population of the United States is non-immune to yellow fever, the introduction of the disease from South America into the southern states must be considered as a possibility. The last epidemic of yellow fever in this country occurred in 1905. It was almost completely confined to New Orleans, in which city there were 434 deaths in that year.

Endemic typhus is also to be reckoned with in the southern states, where the disease is apparently on the

TABLE IV  
NUMBER OF DEATHS FROM DENGUE

States	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Ala.	-	-	-	-	-	-	-	16	2	-	1	0	-	3	1
Calif.	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Fla.	4	-	-	1	2	-	8	125	19	10	11	8	3	4	0
Ga.	-	1	-	-	-	3	-	128	17	2	2	0	-	6	0
Ky.	-	-	-	-	-	-	-	-	1	-	1	0	-	-	0
La.	-	-	-	1	-	-	-	143	52	-	1	1	-	2	1
Mich.	-	-	-	-	-	-	-	-	-	-	0	0	1	-	0
Miss.	-	-	-	-	-	-	-	16	5	-	1	1	-	3	0
Mo.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
N. Y.	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Pa.	-	-	-	-	-	-	-	-	-	-	0	0	1	-	0
S. C.	-	-	-	-	-	-	-	40	2	-	-	-	-	1	-
Tenn.	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-
Tex.	-	13	2	4	-	-	-	78	11	1	1	0	-	1	1
Utah	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vt.	-	-	-	-	-	-	-	-	-	-	0	0	1	-	0
Va.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Wis.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-

increase. In 1929 it caused 11 deaths in Alabama and during the first 6 months of 1932, 200 cases were reported to the U. S. Public Health Service from Alabama and Georgia; 125 of these cases occurred in Alabama, where there were 5 deaths. It has been found by officers of the U. S. Public Health Service that the important vector of the disease in the southern states is the rat flea. The situation is sufficiently important to call for prompt attention.

#### SUMMARY

The South has made rapid progress in the field of public health. The negro is responsible for death rates in the South that are considerably higher than the death rates in other sections of the country. Any program for the improvement of health and the lowering of

death rates in the South must afford the negro health protection. For the whole population in general, and the negro in particular, intensive public health measures should be carried on to combat such diseases as syphilis, pellagra, malaria, typhoid, tetanus, whooping cough, diarrhea and enteritis in children under 2 years of age, and other diseases which still cause high death rates. That progress has been made in the control of certain diseases in the South is reflected by the figures in Table II.

In the solution of health problems peculiar to the southern states, it is fortunate that those interested in and engaged in public health service in this section of the country can meet together and exchange ideas and experiences and plan for more effective and more concerted action against the common enemy, disease.

---

## Undulant Fever

A STUDY<sup>1</sup> recently carried out in Ontario is not only interesting in itself, but almost more so in the implications involved.

In a hospital for epileptics where the patients were supplied with milk from a herd belonging to the hospital and known to be infected with contagious abortion, 100 patients were tested by the agglutination test, as well as the skin reaction. Under the first test, 63 showed a positive agglutination reaction, in 23 of whom the dilution was 1 to 80 or greater. The intradermal skin reaction was positive in 45, in 7 of whom it was weak, in 19 moderate, and in 19 strong. Clinically, 26 had fever, usually of the undulant type, the average peak being about 100° F. Sixteen were definitely underweight,

running from 20 to 30 lb., while 3 showed enlargement of the spleen, and 2 tenderness in the splenic area.

The authors concluded that 22 per cent gave evidence of active infection, 38 per cent of past infection, and 40 per cent no evidence of infection. While the authors content themselves with commenting upon the value of laboratory tests in general, and the intradermal skin test in particular, some commentators hold that the results indicate that the *Br. abortus* may not only cause the typical fever associated with it, but also may give rise to latent and subclinical infections not usually recognized as types of undulant fever.

#### REFERENCE

1. *Canad. M. J.*, Nov. 1932, p. 490.

# Industry in Medicine\*

C.-E. A. WINSLOW, DR.P.H., F.A.P.H.A. (*Life Member*)

*Professor of Public Health, Yale School of Medicine, New Haven, Conn.*

THE problems with which this section of our Association deals are, for the most part, properly comprised under the title of "Medicine in Industry." If we use the term "medicine" in a broad sense to include the allied sciences of hygiene and sanitation, we are here chiefly concerned with the direct applications of medicine to the safeguarding of industrial tasks and the promotion of industrial efficiency. In the pursuance of such purely industrial aims, however, the scope of services rendered has broadened to an astonishing degree. In many instances the development has gone so far as to transcend the primary concept of a service rendered by medicine to industry. In such cases it would be more accurate to say that industry is serving the broad cause of medicine as a whole since it is providing medical care of unusual quality and under peculiarly favorable conditions not only to industrial employees but to their families as well and sometimes to the entire populations of the communities concerned. It is with such extensions of industrial health services that I propose to deal briefly; and I have chosen the title "Industry in Medicine" to indicate the change of emphasis with which I am concerned.

In general, it may fairly be said that the major stimulus for the development

of industrial medical services in the United States has come from the Workmen's Compensation Acts. The physician was first brought into the factory to care for industrial injuries and thus to minimize compensation costs. Once in the employ of industry, however, he found many other things to do. The care of compensable injuries led on to the care of ambulant cases of non-compensable illness, to periodic health examinations, to sanitary control of industrial processes, and to hygienic supervision of the life of employees. The National Industrial Conference Board in its last report<sup>1</sup> lists the objectives and activities of the medical department in the following inclusive terms:

The following points have been indicated as the foremost objectives of industrial medicine:

1. To place individuals in the work for which they are best fitted
2. To procure and maintain fitness for work
3. To educate the worker in personal hygiene and the prevention of accidents
4. To reduce loss of time, absenteeism, and short work spans

In attaining these objectives medical departments in industry are found to be engaged in the following activities:

1. Physical examinations of:
  - a. Applicants for positions
  - b. Those who have been absent because of illness, upon their return to work
  - c. Employees who are being transferred from one department to another
  - d. Employees to be promoted to more important positions
  - e. Those engaged in occupations hazardous to their health or the safety of others
  - f. Those who have defects that should be followed up

---

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

- g. Older workers
- h. All workers in a general program of health promotion
2. Diagnosis and treatment of injuries resulting from accidents that occur during working hours
3. Diagnosis and occasional treatment of surgical conditions not resultant from working conditions.
4. Diagnosis and treatment of minor illnesses. These are treated usually only so long as the employee is able to come to the plant dispensary or hospital.
5. Assistance, chiefly through advice, in obtaining proper care outside the plant for cases of a more serious nature, or those for which there are no facilities in the medical department. This entails coöperation with the family physicians of employees and with local health organizations, clinics, and specialists. Medical supervision can act as a general clearing house for all matters in reference to medical care of employees.
6. Education of the worker in safety practices, personal hygiene, and health habits.
7. Supervision of sanitation, illumination, ventilation, and all other working conditions that affect health, with special attention to occupational disease hazards.
8. Research.
9. Occasionally, insurance and compensation adjustment.

It is important, I think, in dealing with activities which are expanding so greatly, to consider with some care the underlying principles which justify their existence and which should govern their development. I take it that there are essentially two such principles.

First, the employer has a moral (and often a legal) responsibility to protect his employees against any special hazards to health which are inherent in a particular industry. Measures of this type are not matters of choice, but essential and inalienable duties. Under this heading come such services as the following: safety engineering such as will offer reasonable protection against accident hazards, poisons and dusts; adequate lighting, ventilation and sanitary facilities; care of industrial injuries; and routine medical examination of workers exposed to harmful dusts and to poisonous substances.

These are matters of common justice, as between man and man.

Second, the employer has a clear right (though not a moral responsibility) to provide any further health services which will promote efficiency in industrial production. Under this heading come such items as: physical examination of employees not exposed to special industrial hazards; diagnosis and treatment of non-industrial accidents and illnesses; special physiological and psychological services for the adjustment of the worker to his task; health education and advice as to health habits; provision of luncheon facilities and of opportunities for physical exercise and recreation. The National Industrial Conference Board, in the report cited above, states the argument for medical service from this standpoint of efficiency as follows:

There are two vital, coöperating factors in modern industry, the machine and the man who tends it. If ill health of the worker, causing labor turnover or absenteeism, stops the machine, there is a loss in output. In like manner, if the machine fails to run to its full capacity during working hours because the worker is listless or inattentive, there is loss in productive efficiency. One of the principal reasons for failure of the worker to do what he is capable of doing is an impaired physical condition. He may have a cold or other minor ailment, perhaps the beginning of a more serious illness, or he may have returned to work after an illness before he had gained his full strength. For one cause or another he has an impaired vitality which lowers his efficiency. When the services of a medical department are freely sought and freely given there is a continuous conservation of the health of the employees which keeps their efficiency at normal levels and enhances the value of their services to their employers.

The same report cites a particular instance in which absenteeism due to illness and accidents was reduced from 4 per cent of all working time to 1.3 per cent by health supervision. The cost of the medical service provided was \$6,398. The saving involved in workmen's compensation and group life

insurance premiums was estimated at \$2,848 and the saving to the company by reduced absenteeism at \$5,370—a total of \$8,218.

These two motives, then—justice and efficiency—are the sound bases of industrial health and welfare work. Anything which can be justified on either of these grounds is wise and reasonable. Anything which cannot be shown to contribute to one or the other of these ends is of doubtful value as an industrial activity. For industry which embarks on philanthropy (except in times of temporary and peculiar economic stress like the present one) lays itself open to the obvious criticism that if there are available such large profits as to justify philanthropy it would be sounder to turn such profits into increased wages or lowered costs and permit the employee or the purchaser to benefit himself in his own way.

In the present discussion we are concerned chiefly with those measures which extend beyond obvious moral obligation; and the first of these is the provision of health examinations for the general working staff. This practice has grown rapidly in recent years. The National Industrial Conference Board report states that of 1,818 companies covered in its 1930 survey, 53 per cent were making initial physical examinations of employees and 20 per cent subsequent periodic examinations. Miss Elizabeth Dublin in a more recent study made for the National Tuberculosis Association (courteously communicated to the writer in manuscript) has covered 6,012 plants employing 4,402,280 persons and reports that 5,542 of these plants with 4,105,171 employees had examinations before employment while 3,254 plants with 3,134,740 employees had subsequent periodic examinations for at least some of their employees. These figures are most surprising and encouraging.

The advantage of the physical ex-

amination, both to the employer and the employee, is very great. Its primary objective—even in the examination before employment—should not be rejection of the subnormal worker. The Conference Board of Physicians in Industry has laid down the principle that the applicant should be rejected only if his disability is such as to make his employment a menace to himself, to fellow employees or others, or to property. Of 221 plants reporting to the N.I.C.B. in 1930, 38 rejected more than 10 per cent of applicants as a result of the health examination, which indicates the application of an unduly severe standard. In general, nevertheless, it appears wholly reasonable that a company which may be called on to pay compensation should have a record of the physical condition of its workers prior to employment, and the benefit to the employee himself in the detection of correctible defects and in selection of a safe line of employment is inestimable.

The second field in which medical service in industry has broadened out has been in the diagnosis and treatment of non-compensable injuries and illnesses. Here, as in the case of the physical examination of workers engaged on tasks free from specific industrial hazards, there is no moral obligation involved. The reason for such developments is that minor illnesses form the major cause of industrial absenteeism. Experience has shown that prompt and competent medical care will materially reduce such temporary disability; and also that prompt and competent medical care is not generally available for the factory worker on terms and under conditions which actually lead to its utilization. Hence, many industries provide general diagnostic service for their employees, render first aid treatment in emergencies, and give assistance and counsel to the worker who requires more prolonged care.

These two types of activity, the health examination and the diagnosis and emergency treatment of illnesses of a non-industrial nature, represent fairly common extensions of industrial health service into the domain of general medicine. In certain instances, the process has gone much further; and it is these more extensive developments which I have indicated by the title "Industry in Medicine" and which I propose briefly to review.

If it be granted that maximum efficiency in industry depends on a working force which enjoys a maximum degree of physical and mental health, it is clear that the employer is vitally concerned with the general medical care available for his employees. If diagnostic service and first aid provided by the plant and other medical service provided by existing facilities of private medical practice and public clinic service are adequate, well and good. If such facilities are not meeting the situation, however, the employer may very properly consider whether a further extension of industrial health service will not bring returns commensurate with the cost involved.

According to Pierce Williams,<sup>2</sup> about 540,000 gainfully employed persons in mining and lumbering companies in 21 states were eligible in 1930 for medical care on such an organized basis. In consideration of a fixed periodic deduction from wages these employees are entitled to medical treatment for conditions not covered by workmen's compensation, the payment being sometimes voluntary and sometimes a condition of employment. These industries, it is obvious, are usually carried on in isolated regions where medical care could not be obtained unless it were furnished by the industry itself. Similar services are provided for about one-third of all the Class I railroads of the United States by memberships in employee hospital associations.

Finally, we must recognize that the industrial employee is generally not an isolated unit but a member of a family. If there is uncared for illness at home his worry and distress may gravely impair his efficiency. Where the local medical facilities are inadequate, may it not, therefore, be justifiable for industry to provide medical care for the family as well as for the worker himself? In a surprisingly large number of instances, this question too has been answered in the affirmative.

The Committee on the Costs of Medical Care has made several illuminating studies of enterprises of this kind. The Endicott-Johnson Company of Binghamton, N. Y., for example, provides very complete medical care for all its employees and their families.<sup>3</sup> The service covers all ordinary types of medical care for ambulant and bed cases, including physical therapy, X-ray therapy, heliotherapy, and the services of a psychologist for patients not overtly psychotic. It covers dentistry so far as simple repair, extractions, and hygiene are concerned. It covers nursing in home as well as in hospital. It provides drugs and medicines free; but not orthopedic supplies and eyeglasses except to those reported as unable to pay for them.

The organization maintains three medical centers each including hospital service, a first aid station and clinic, and several travelling clinics. The staff in 1928 included 28 physicians, 4 dentists, 5 dental hygienists, 2 physical therapists, 67 trained nurses, 4 bacteriologists, 4 pharmacists, 17 technicians, and 16 clerks and office assistants. The organization in addition calls extensively on outside facilities, having spent \$250,000 in 1928 for care of patients in community hospitals and \$40,000 for outside specialist and consultant service.

There were 15,230 workers employed by this company during the year 1928

with 25,891 dependents (according to Carpenter's estimate), a total of 41,121 persons eligible for service. Carpenter concluded from a special sampling study that 77 per cent of these persons used the company service only, and an additional 17 per cent used it in part. The total cost of the medical organization was \$898,874 or \$25.49 per year per individual in those families which actually used the service.

The quality of the medical service rendered (as reported upon by highly qualified experts in medicine and surgery) was equal to or better than that provided in similar areas by private physicians; and free choice of physician within the staff and the general flexibility of the system secured a high degree of sound personal relationship between physician and patient.

As pointed out, industrial medical services of this type have most often been provided in remote areas where no private practitioners were available. Even in more urban communities, however, there are distinct advantages in such a program. The first and foremost of these advantages is that under such an organized program medical advice will be far more generally utilized for health examinations and for the early treatment of incipient disease than would be the case if the individual were left to seek and to pay for medical services on his own initiative. Since prevention and early recognition of incipient disorders form the keystones of modern medicine it is difficult to exaggerate the importance of this factor. The second major argument for an organized medical program serving a group of industrial employees is of course the economy of overhead charges and of the time of professional personnel which is involved.

These values of an industrial medical service are excellently illustrated by another of the studies of the Committee on the Costs of Medical Care dealing

with the Homestake Mining Company.<sup>4</sup> This is a corporation mining gold in the Black Hills of South Dakota with headquarters in the town of Lead. It employed in 1930 an average of 1,855 persons and provided medical care without charge for all these employees and their dependents—a total of 5,332 persons. The service included all forms of medical and hospital care but not dental care and not home nursing. Medicines were provided free but eyeglasses only at cost. The company maintained a 26-bed hospital with a well equipped dispensary including laboratories, X-ray and physiotherapy rooms. The staff consisted of 5 full-time physicians, 6 registered nurses, and a dispensary nurse. Employees had free choice among the 5 physicians and relationship with patients was close and intimate. The total cost of the medical department in 1930 was \$79,326, or \$14.88 per person served.

From the standpoint of completeness, Reed compares the volume of service rendered with that actually received by groups of the general population of the United States at comparable economic levels (as revealed by other studies of the Committee on the Costs of Medical Care). He finds that the amount of hospital care for the Homestake group (excluding industrial accidents) is almost exactly the same as that for the general population (0.6 day per person per year); while the number of medical home calls (2.1 per person per year) is about twice that for the general population, and the number of office and clinic calls (8.7 per person per year) is more than 6 times that for the general population.

The values from the standpoint of economy are equally clear. Reed analyzed the Homestake records with great care as to the exact number of services of each kind which were rendered and estimated the cost of such services at the prevailing rates in force



in districts adjacent to Lead. He found that the services which actually cost \$79,326 would have cost \$175,378 if obtained under ordinary conditions. Yet the medical staff of the company receive salaries well above the average for similar areas.

There are obviously certain dangers which inhere in any such program which involves the conduct of medical practice under lay control. These dangers fully justify the opposition of the American Medical Association to any form of contract practice which involves unfair competition. It seems clear, however, that "unfair competition" cannot be held to result from superior efficiency and economy of organization since the basis of medical ethics is ultimately the welfare of the patient. "Unfair competition" exists when either (a) the service rendered to the patients is below standard, or (b) when the physicians employed are exploited by under-pay or overwork (which in the long run must of course operate to the detriment of the patients themselves). These dangers must be constantly guarded against in industrial medical services. They do not appear to be manifest in either the Endicott-Johnson or the Homestake program.

In both the instances cited, the entire cost of the medical service was borne by the industry concerned. In other instances organized medical programs have been developed under the auspices of employee groups. Examples of this type are to be found in the operation of a hospital with a salaried medical staff by a branch of the United Mine Workers of America at West Frankfort, Ill., and in the provision of medical care through part-time salaried physicians by the New York Letter Carriers' Association. According to Pierce Williams in the report cited:

In by far the greater number of industrial medical services, the provision of care is financed jointly by the company management

and by the employees. Such arrangements usually develop from contracts which the companies draw up with local medical practitioners and hospitals, or from the organization of a medical department under the company's direction. The employees contribute through payroll deductions.

Williams cites the services in the mining and lumbering industries and in railroading as examples of this type of organization, which seems a highly promising one. The psychological relationship between physician and patient and the attitude of the employee toward the service as a whole are likely to be sounder and more fruitful if the employee realizes that he is contributing toward the support of the program.

As illustrating how a medical organization may be developed through a group of small industries acting jointly for the service not only of their own employees but of other members of the community, we may consider one final example—that of Roanoke Rapids, N. C. This is the third of the special industrial studies of the Committee on the Costs of Medical Care.<sup>5</sup>

The program at Roanoke Rapids began with the employment of physicians by the local cotton mills. To meet obvious local needs these physicians on their own initiative established a hospital which was later purchased and enlarged by the mill corporations. At this time (in 1924) the employees of the mills, with only 4 negative votes among 2,500 employees, approved a payroll deduction of \$.25 a week to pay for hospital care. The program therefore represents a rather unusual coöperation between employers, employees, and medical staff in which all three have played an active part.

The organization in 1930 was as follows—5 physicians and 3 visiting nurses were employed by 4 industrial establishments to care for their employees, and the employees of these 4 companies and of a fifth company contributed \$.25 a week for hospital costs. Al-

though the physicians and nurses were separately and independently employed by the various firms, they operated as a group, with free choice for the entire population served and with some degree of specialization in surgery, pediatrics, and internal medicine. Home, dispensary and hospital care and home and hospital nursing are all provided to the group of mill employees and their dependents and to local groups of teachers and nurses, a total of 4,919 persons. Dentistry and drugs are not provided.

The rest of the population (5,693 persons) is cared for by the same medical staff (and by the one additional physician in the community, a specialist in eye, ear, nose and throat work) on a fee basis since the salaried physicians are permitted to do outside practice in their spare time.

This arrangement made it possible to compare services and costs for two approximately equal population groups in the same community, one served on an organized and the other on an unorganized basis. The economic status of the two groups was approximately equal (\$24.50 per week income per family for the mill group as compared with \$27.16 for the non-mill group).

The mill group paid \$17.44 per capita during the year for medical services, the non-mill group, \$10.34. About one-third of the \$17.44 came from the employees directly in monthly check-off plus additional costs paid individually, the other two-thirds from the companies. This, of course, illustrates the fact that an organized contributory program, plus a subsidy from the employer, increases the total amount of money available for the costs of medical care. For this additional 70 per cent of expenditure, moreover, the mill group actually received over 500 per cent more days of hospital care, 350 per cent more clinic visits and 240 per cent more home calls. The actual figures (for a

typical group intensively studied): 3.2 patient days a year for hospital care in the mill group as against 0.5 day for the non-mill group; 1.8 dispensary visits per year for the mill group as against 0.4 for the non-mill group; 2.4 home calls a year for the mill group as against 0.7 for the non-mill group.

It seems clear to the writer that two basic principles must govern the development of medical service in the United States if the potential resources of modern medicine are to be made really available for all the people under conditions of maximum effectiveness.

In the first place the studies of the Committee on the Costs of Medical Care have demonstrated the great advantages of organization of the professional personnel and equipment which renders the medical service. Such organization may be effected by the profession itself, by an industry or some other agency representing the patient, or by the coöperation of both; but, if soundly and wisely planned it benefits both profession and patient. The patient receives better service from an organized than an unorganized service, for a given individual physician will be both psychologically stimulated and materially assisted by working in intimate relationship with a group of his peers, and the patient receives a given service at substantially lower cost on account of the saving of overhead and of professional time inherent in organization. Similarly, the physician gains from group practice better conditions for work and larger and more assured income.

In the second place, it is equally clear that the consumers of medical service should be organized so as to facilitate the payment for such service. The average costs of medical care are too low rather than too high. What causes our difficulties is the fact that illness is an emergency. While many families in a given year pay little or

nothing, one family out of a hundred will be crippled by costs equivalent to a quarter or a half of its annual income. It is quite obvious that here, as with other emergencies of life, the rational answer is to apply the principle of insurance. Whether the funds come from a group of individual families, from their employers, from the state, or from two or all of these three sources, the payment into a common fund of a certain sum for each family each year is the essential element in the scheme. Such an arrangement wipes out the burdens of the care of emergency illness by spreading them over a group of families and a period of time. It makes easily available considerably larger total sums for medical care than could otherwise be secured. Finally, and perhaps most important of all, it makes possible a true preventive medicine, based on the health examination and the prompt treatment of incipient disease, such as can never be attained when the consultation of a physician calls for an immediate corresponding financial obligation.

There are many and various ways in which such organization for the delivery of medical service and such organization for the payment for medical service can be attained. On the professional side, it would seem ideally desirable that the organization should take place under professional auspices, with such safeguards for the public interests as are furnished for example by the Board of Trustees of a voluntary public hospital. I can visualize a time when such hospitals will attach to themselves the great majority of physicians in their respective areas and will provide complete hospital, dispensary and domiciliary care on a fixed annual fee basis. If medical agencies fail to take the initiative, however, lay agencies must do so; and industry will, in many communities, be in position to do what has been done at Bing-

hamton, Lead, and Roanoke Rapids.

On the payment side, the one logically complete answer to the problem is that given by compulsory state sickness insurance. This is the answer which has been given in practically all European countries; and it may prove to be the ultimate solution in the United States. The program has, however, shown serious defects even in Europe and these defects might perhaps be exaggerated in the political atmosphere which prevails on this side of the Atlantic. Here, as in many other fields of social endeavor, there is at least a possibility that industry—actuated by a new sense of social responsibility—can attain some of the ends sought by state action in Europe with results more in keeping with our national psychology. The extent to which American industry can evolve such a sense of social responsibility during the next 20 years will determine the issue.

“Medicine in Industry” has come to stay. It will always be essential that the employer should safeguard his workers against the specific hazards inherent in their employment. How far “Industry in Medicine” may develop, only time will show. It will, I think, come to be recognized that an organized program of medical services paid for on a periodic contributory basis is an essential of sound community life and therefore of industrial life which forms the basis of community life. Such a program will ultimately be carried out on a basis of state action if the need is not first met in some other way. I can see no other way for industrial communities than the organization of the payment side of the problem by the industries themselves—either contracting for organized medical service with hospitals, group clinics or other professional agencies or providing through industrial initiative the service as well as the system of payment. It will be well for the far-sighted industrialist to study

this problem with care, particularly if he is not anxious for the extension of governmental agencies into new fields of activity.

#### REFERENCES

1. *Medical Supervision and Service in Industry*, National Industrial Conference Board, Inc., 247 Park Ave., New York, 1931.

2. Pierce Williams. *The Purchase of Medical Care through Fixed, Periodic Payments*. National Bureau

of Economic Research, 51 Madison Ave., New York, 1932.

3. Niles Carpenter. *Medical Care for 15,000 Workers and their Families; a Survey of the Endicott Johnson Workers Medical Service; 1928*. Publication No. 5, Committee on the Costs of Medical Care, 1930.

4. Reed, L. S. *The Medical Service of the Homestake Mining Company*. Publication No. 19. Committee on the Costs of Medical Care, 1932.

5. Falk, I. S., Griswold, D. M., and Spicer, H. I. *A Community Medical Service Organized under Industrial Auspices in Roanoke Rapids, North Carolina*. Publication No. 20. Committee on the Costs of Medical Care, 1932.

## Scholastic Standing and Mouth Condition

IN 1912, Dr. Fones, of Bridgeport, Conn., found that 40 per cent of the children in that city showed retardation in their school work. He began the practice of dental hygiene on them, and 4 years later, the number of deficient children was reduced to 20 per cent.

In Atlanta, Ga., Dr. Sutton found that after the mouths of school children were put into healthy condition, the percentage of failures dropped from 22 to 8 per cent.

Recently, 164 junior high school boys in Minneapolis averaging 14 years of age were subjected to a similar experiment, 56 being among the best pupils of the school, 59 among the worst, and a third group of 49 were used as controls. The dental examinations were made with no knowledge of the

scholastic standings of the boys. A careful record was kept and the mouth conditions graded as excellent, good, fair, or poor. Of 7 boys who had excellent teeth, 6 were in the group of excellent students, and only 1 poor, and of those having poor mouths, 5 were poor students, 3 were in the control group, and 1 was excellent. Of the excellent students, 70 per cent had mouths which were either excellent or good, while of the poor students, only 51 per cent were in these two classes. The study is being continued on larger groups and attempts being made to correlate the mouth conditions of the children with the occupational status of fathers.—Joseph T. Cohen, D.D.S. *Scholastic Standing and Mouth Condition, Mouth Health Quart.*, Jan., 1933.

# Suggested Method of Computing and Standardizing the Maternal Mortality Rate\*

ROBERT J. LOWRIE, M.D.

*Attending Obstetrician, St. Vincent's Hospital, New York, N. Y.*

SINCE the publication of my original paper<sup>1</sup> on this subject I have had, from different parts of the world, several letters containing criticisms and suggestions regarding the proposed method of computing and standardizing the maternal death rate. As the method suggested necessarily involves some of the principles of the present method, a good share of the criticisms aimed at me also strike at the method now in vogue of arriving at the maternal death rate. My paper, then, has evidently served a twofold purpose.

The present work is the result of an attempt to rewrite the original article in simpler form, using as a guide the material found in those letters which my correspondents have kindly forwarded to me.

In the United States for the year 1928 the maternal death rate was 69 per 10,000 live births. For the same year in the Netherlands the rate was 34 per 10,000 live births. Does this mean that the pregnant woman in the United States actually runs double the risk of dying in childbirth of her sister in the Netherlands? Or might the difference in the two rates be due, in some

measure, to variation in methods of computation?

Of late, considerable attention has been directed toward certain fallacies which may arise in the comparison of maternal death rates. The League of Nations has given several reasons why comparison of International Vital Statistics may lead to erroneous conclusions. The publications of the U. S. Bureau of the Census also caution the reader in this regard.

Hospitals, maternal welfare or visiting nurse organizations, etc., sometimes quote their maternal death rates and then commit the unpardonable error of comparing these "low" rates with the "high" rate of the country as a whole.

The death rate of the maternity hospital or organization is a *selective* and necessarily lower rate than that of the community or country of which it is a mere sample. There are two chief reasons for this: (1) the difficulty, especially in a large metropolitan center, of following to the end of 1 month after birth *all* women registered for childbirth; (2) the maternity institution being primarily concerned with birth of children has on its records a relatively small proportion of cases such as abortion, miscarriage, ectopic. However, the deaths from these, as well as the deaths of women not accounted for 1 month after giving birth, appear on the roster of the Board of Health.

\* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

Yet from surveys such as these has emanated the widely disseminated assertion that in the United States 2 of every 3 maternal deaths are unnecessary.

Physicians actually in attendance on confinement cases terminating fatally often find it difficult to state on the certificate whether death was due to childbirth or to some complicating condition such as heart disease, tuberculosis, etc. His opinion as to the cause of death is final only if it agrees with the vital statistician's interpretation of the classification in the *International List of Causes of Death*. It is readily seen that the maternal death rate may vary with precision of application of the rules for allocation of causes of death, and this quite independent of number of deaths. In spite of this possible obvious disparity, the maternal death rate is computed to within 0.1 per cent.

The primary object of computing a death rate is to compare it with that of some other community or country. It is important, therefore, that if death rates of different areas are to be compared, first, all deaths must be included, and second, there must be some standard method of computation. The crude, general and true death rate is the result of computing the relation between the *exposure group*, or number of persons alive at the beginning of an interval of time, and the number in that exposure group who died during the same interval.

In case of the maternal death rate the method of computation is somewhat different. If in a given area in a given year, 668 women died of causes directly assignable to childbirth, and if during that year there were 121,462 babies registered as born alive, then the maternal death rate is 55 per 10,000 live births, as given by

$$\frac{668}{121,462} \times 10,000 = 55 \dots \dots (1)$$

Because of the very incomplete registration of pregnancies which issue in the form of abortion, miscarriage, and ectopic gestation, there is no accurate record of the number of women in whom pregnancy terminated in less than 28 weeks. Since the number of live births from pregnancies under 28 weeks is very small, the exposure group in the definition of maternal death rate, 121,462 in equation (1) above, refers practically only to the last 12 weeks of pregnancy. The number of deaths, 668, refers, however, to the whole 40 weeks of pregnancy. The denominator of (1) is short the number of women whose pregnancy ended under 28 weeks. The effect of this is to give a relatively high value for the maternal death rate.

As the denominator, 121,462, of the fraction for getting the maternal death rate refers only to "live" births, it is readily seen that the rate would rise in proportion to deficiency in birth registration. The same thing might happen where the proportion of live births—of *all* births—was relatively low.

It is seen then, that the maternal death rate as defined in terms of registered live births, varies with the rigidity of application of the rules for allocation of causes of death; is overstated by its own definition; increases with deficiency of birth registration, and with the number of maternal deaths which occur before birth of child; very probably increases where the proportion of live births in all births is relatively low.

It is quite natural then that we should seek a method of measuring the maternal death rate which would be free of the variables mentioned above, which would conform to the definition of the crude or true death rate, and which could be used to make reliable comparisons, national or international.

Registration of births of gestation 28 or more weeks permits of a method

(q.v.) of computing the corresponding exposure group of women, which when related to the deaths in this *same* group gives the death rate of women in this span of pregnancy. But there still remains to be considered those women whose pregnancies terminate by abortion, miscarriage, or ectopic. The incomplete registration of these does not allow of calculation of the exposure group and hence of a true death rate. These deaths might be related to the number of non-childbearing females in the same age class, or they could be stated as a percentage of the total deaths for all periods of gestation. Employment of either of these two methods is merely making the best of the situation.

A woman pregnant 28 or more weeks is said to have a *viable pregnancy*. This class of women I have designated the *childbearing group*, or the exposure group.

The number of deaths in women in the childbearing group is, of course, the number of death certificates in women pregnant 28 or more weeks, on which certificates pregnancy or childbirth is given as *either the primary or contributing cause of death*. Pregnancy advanced to the period of viability, or even to the 5th or 6th month, is not likely to escape mention by the medical attendant. When necessary, further information as to period of gestation and whether death occurred before or after delivery, can be obtained by a supplementary communication to the physician. Generally speaking, this information is as available as any other data on the death certificate.

As practically all deaths related to pregnancy or childbirth have occurred by the end of 1 month after birth, we shall consider all deaths in childbearing women which take place during the pregnancy or within 1 month after birth.

The exposure or childbearing group is obtained from birth registration data and is the number of women in whom pregnancy terminated by live birth or stillbirth during or after the 28th week of uterogestation. Referring to these viable pregnancies, the number of women in the exposure group would be found by adding the live births to the stillbirths, deducting 1 and 2 for twins and triplets, and adding the number of women who died before giving birth.

Unfortunately, bureaus of vital statistics do not usually make a separate tabulation of stillbirths of gestation 28 or more weeks. Also, the number of multiple (twin or triplet) births listed may include cases of gestation under 28 weeks. On the other hand, the registered live births is a much more reliable figure and it can, when necessary, be corrected for any deficiency in birth registration. Furthermore a "live birth" practically always implies gestation of 28 or more weeks. Therefore, in case of live births, classification of these in terms of gestation is not necessary in arriving at the exposure group.

If bureaus of vital statistics would furnish separate tabulations for multiple births and stillbirths of gestation period 28 or more weeks, then the number of women in the exposure or childbearing group is very accurately and readily obtained. It should be remembered that most women bearing children can be just as accurate about the time of expected confinement as they are in regard to giving their age.

There is a second, and I think fairly reliable method of calculating the exposure group. It has no direct relation to plural births or to stillbirths. An institution such as a maternity hospital or maternity service can have, and usually has, complete record of *all* births as well as the period of uterogestation of each woman giving birth. If we deduct the number of women

whose pregnancies terminated under 28 weeks and then relate this remainder to the number of number of live births we can get a very useful ratio.

In Table I is shown a representative and aggregate sample of consecutive cases from 5 maternity services in greater New York, in the year 1930. The ratio of childbearing women to live births multiplied by 1,000 (column 3) is what I have chosen to call the "converting ratio."

The result for the converting ratio obtained in column 3 of Table I allows us to say, for the representative sample, that for every 1,000 babies born alive there were 1,110 childbearing women. Assuming, as we have done, that our sample is a representative cross-section of the whole city, then the number of women bearing children in New York City is found by multiplying the number of live births, 74,233, by the value of the converting ratio, 1,010/1,000, giving 74,975 (column 5).

Generally speaking, the proportion of live births in home confinements is probably comparable to that of the institution. It is true that the difficult cases are more liable to gravitate to the hospital, but it is also true that the hospital has more facilities for conserving life. As may be seen later, a fairly wide margin of error in the converting ratio gives rise to a relatively small deviation in the computed death rate.

In Table II the number of women bearing children, 74,975, when added to the number of women who died before giving birth, gives us in column 3 the number of women in the exposure or childbearing group, viz., 75,009. When the number of deaths from all causes in women in childbearing or exposure group, 246, is divided by the number of women in the group, 75,009, we obtain as is shown by column 5 of Table II and by the equation

$$\frac{246}{75,009} \times 1000 = 3.28 \dots \dots (2)$$

TABLE I

THE NUMBER OF WOMEN BEARING CHILDREN, OBTAINED FROM REGISTERED LIVE BIRTHS  
BY THE METHOD OF THE CONVERTING RATIO

New York City			Ages 20-29		Year 1930	
Representative Sample*			New York City			
Livebirths	Childbearing women	Converting ratio	Live births corrected for deficient registration of 1 per 1,000	Women bearing children Column 4 multiplied by column 3		
		Column 2 Column 1 x 1,000				
5,083	5,134	$\frac{5,134}{5,083} \times 1,000$ $= 1,010$ or 1,010 $\frac{1,010}{1,000}$	74,233	$74,233 \times \frac{1,010}{1,000}$		74,975

\* Aggregate sample of consecutive cases from maternity services in New York City in year 1930: Manhattan Maternity and Dispensary, Sloane Hospital for Women, City Hospital, New York Nursery and Child's Hospital, and the Methodist Episcopal Hospital of Brooklyn.



TABLE II

DEATH RATE IN CHILDBEARING WOMEN IN AGE CLASS 20-29 FOR NEW YORK CITY IN YEAR 1930

(1)	(2)	(3)	(4)	(5)
Women bearing children	Deaths before birth of child	Women in childbearing group	Deaths from all causes in childbearing women during pregnancy or within 1 month after birth	Death rate in childbearing group $\frac{\text{Column 4}}{\text{Column 3}} \times 1,000$
74,975	34*	75,009	246†	3.28 per 1,000

\* There were 68 women in all age groups who died before giving birth. As about half the births occur in the age class 20-29, I have assumed likewise that about half the deaths, viz, 34, also took place at these ages.

† In the age class 20-29 there were 319 deaths in women at any period of gestation. Referring to all ages, of the total of 667 deaths, 515 or about 78 per cent were in women pregnant 28 or more weeks. On the assumption that the proportion 78 per cent holds good, approximately, for the separate age groups, 246 is found, by taking 78 per cent of 319. It will be seen then that this assumption will have the effect of slightly under- or over-stating the death rate in the separate age groups. In this series I have been given to understand that practically all deaths in women pregnant 28 or more weeks are listed as of maternal origin.

the death rate of 3.28 per 1,000 for women in the childbearing group.

In equation (2) we have an expression which conforms to the definition of the crude or general death rate. It is therefore the true death rate from all causes of childbearing women in age class 20-29. It is seen that the true death rate, so arrived at, involves no element of correction or personal equation. It depends only on standard data—age of mother, status in pregnancy, and relation of death thereto—all of which can be obtained by birth and death certification in any locality or in any country.

In making a comparative study of maternal death rates it is this general death rate in childbearing women to which we should direct our attention, rather than the corrected rate given in terms of live births which, as we have seen, can by its own definition, vary within wide limits.

In my original paper I did not compute rates for the separate age groups. For this I have been criticised and, I

presume, rightly. It may be noticed, however, that this criticism has not been aimed at the present method, giving the rate in terms of maternal deaths per 1,000 live births.

The crude and general death rate for childbearing women in the age class 30-34 in New York City, 1930, I have computed in the same way and find it to be 4.69 per 1,000.

We have seen, for instance in the age class 20-29, that the 3.28 per 1,000 of equation (2) includes all deaths. If we use round numbers and regard the rate as 328 per 100,000 we may ask in how many of the 328 women death was caused by some complicating ailment such as heart disease or tuberculosis. How many of them would have died even if not pregnant? Or, what is the death rate in puerperal women from causes other than childbirth—the so-called normal death rate? If such a rate can be obtained and then subtracted from the general death rate in childbearing women the remainder is the death rate in women who died solely

TABLE III

New York City

Age Class 20-29

Childbearing Women		Married, Non-childbearing Women	
Number	(1) (a) 75,009	Total married women	(2) (a) 371,992
Deaths during pregnancy or within one month after birth	(b) 246	Married non-childbearing women 2 (a) less 1 (a)	(b) 296,983
		Deaths in married non-childbearing women Census figure less 1 (b)	(c) 1,041
Death rate  (Applies for only 16 weeks of year)	(c)  3.28 per 1,000	Death rate in married non-childbearing women (Applies for whole year)	(d)  3.50 per 1,000

because of pregnancy and childbirth—the death rate *per se* due to pregnancy and childbirth.

In attempting to get a value for the normal death rate we should examine the death rate in a group of women identical with childbearing women except as to pregnancy and childbirth. We might then regard, for the particular year and age class, the death rate in married non-childbearing women. This data can be obtained from bureaus of vital statistics and from the census figures.

In Table III is shown the death rate in childbearing women and the rate in married non-childbearing women for the age class 20-29 in a given year. As may be found from actual computation, a wide margin of error incident to estimating the population for an intercensus year involves a relatively small deviation in the computed death rate.

If the death rate in married non-childbearing women is to be compared with that of the childbearing group we must multiply by 16/52. Then, by subtracting the two rates and placing them in equation form we have, for age class 20-29,

$$\frac{3.28}{1,000} - \frac{16}{52} \times \frac{3.50}{1,000} = \frac{2.20}{1,000} \dots (3)$$

$$\frac{328}{100,000} - \frac{108}{100,000} = \frac{220}{100,000} \dots (4)$$

The interpretation of equation (4) may be given as follows, and is subject to the truthfulness of the assumptions used in obtaining the data for Tables I, II and III: In New York City in the year 1930, referring to age class 20-29, of every 100,000 women who entered the 28th week of pregnancy, 328 died during pregnancy or within 1 month after birth. In that 328 there were 108 whose primary cause of death was not pregnancy or childbirth, but rather some associated condition such as heart disease or tuberculosis; and of the 328, the remainder 220, died primarily because of pregnancy or childbirth. The rate, 220 per 100,000 childbearing women, is the death due to pregnancy and childbirth, *per se*.

For the age class 30-34 in the year 1930 in New York City the death rate *per se* was computed in the same way and found to be 352 per 100,000.

When this rate is compared with the 220 per 100,000 for age group 20-29 it is readily seen that the rate *per se* increases with advance of age, and this quite apart from the increase in the general death rate due to age.

In the original paper the deductive factor, represented as 108 per 100,000 in equation (4) in the present work, included all women who did not bear children during the year. One or two of my critics pointed out that inasmuch as the death rate in those physically or mentally unfit for marriage would be relatively high, the deductive factor would be correspondingly raised, and hence the death rate *per se* would be proportionately understated. With this in mind, I have made up Table IV.

On comparing the two values of the deductive factor for the same age class, in Table IV, does it seem to make very much difference whether or not the deductive factor takes into account marital status? Of course, Table IV represents only 1 year in New York City.

It will be seen that equation (4) is true only if the normal death rate in childbearing women (the rate of death from causes other than puerperal) equals the value of the deductive factor. The right to assume this has been questioned. James B. Russell and I are at present gathering some data pertinent to this matter and we are testing out a modified\* form of equation (4).

\* Referring to women age  $x$ , let  $cQ'x$  be the death rate in childbearing women due to pregnancy and childbirth,  $cQx$  the normal death rate in childbearing women,  $ncQx$  the death rate in women not in the childbearing group; also let  $cQx / -ncQx = K$ , then the death rate due to pregnancy and childbirth *per se* for the last 12 weeks of pregnancy and first 4 weeks after birth is:

$$cQ'x = (cQ'x + cQx) - K - ncQx \dots\dots\dots (5)$$

If the normal death rate equals the deductive factor, then  $K=1$  and the equation becomes

$$cQ'x = (cQ'x + cQx) - 1 - ncQx \text{ which is the general form of equation (4) above.}$$

We observe from Table IV, age class 20-29, that the rate of death *per se* is about two-thirds the crude death rate. If we were to compute the maternal death rates in terms of live births, we should also find approximately the same relation. In the age class 30-34 (line 2 of Table IV), the death rate *per se* is about one-quarter less than the crude death rate. There seems to be no reason to suppose that this excess of a quarter or a third would not also be true for deaths in women pregnant less than 28 weeks. The proposed method of computation then, may serve as a check on the present method. In view of the fact that New York City affords a real representative cross-section of a cosmopolitan population, and assuming that 1930 is very probably not different from any other year, may we hazard the guess that the maternal death rate as computed by the present method, is a quarter to a third overstated?

#### SUMMARY

It is thought that the present method of computing the maternal mortality rate, as the relation between maternal deaths and registered live births, is subject to several sources of error:

1. It varies with the precision of application of the rules for the allocation of causes of death.
2. It is overstated by its own definition.
3. It increases in proportion with deficiency of birth registration and with the number of maternal deaths occurring before birth of child.
4. It very probably increases when the proportion of live births—of the total of all births—is relatively low.

Because of the errors incident to computation of maternal death rates by the present method, the comparison of maternal mortality rates in different areas or countries may often lead to unwarranted conclusions.

Sweeping generalizations from rates in small samples usually lead to mis-

TABLE IV

THE DEDUCTIVE FACTOR IN THE MATERNAL MORTALITY RATE, PER SE, NEW YORK CITY 1930

Components of the deductive factor	Age class	True death rate per 1,000	Deductive factor per 1,000	Mortality rate per se (per 1,000)
Married women not bearing children	20-29	3.28	1.08	2.20 (1)
	30-34	4.69	1.17	3.52 (2)
Married, single, widowed or divorced women not bearing children	20-29	3.28	0.98	2.30 (3)
	30-34	4.69	1.18	3.51 (4)

interpretation. It has been pointed out that the death rate of a country, state, or large center is the representative and nonselective rate while that of the maternity organization—hospital, visiting nurse service, etc., is necessarily a selective rate and one which does not represent conditions in general.

A low maternal death rate attainable in an institution in a large center does not imply that the rate for the country at large could be reduced to the same level.

Bureaus of vital statistics usually do not have record of the number of women giving birth. If these bureaus would make a separate tabulation of stillbirths and multiple births of gestation 28 or more weeks, the number of women pregnant 28 or more weeks (childbearing group) would be found by adding these live births and stillbirths to the number of childbearing women who died before delivery and then deducting one and two respectively for each set of twins or triplets. If these tabulations are not available, then the number of childbearing women in a given area may be obtained from the number of live births in that area by the method of the converting ratio as shown in Tables I and II.

The exposure or childbearing group of women, however gotten, when related to *all* deaths in that group, gives the crude, true and uncorrected death rate from all causes in childbearing women.

It is this true and uncorrected death rate which should receive first consideration when national or international comparisons are made.

The death rate due to pregnancy and childbirth *per se* is calculated by deducting from the crude death rate the so-called normal death rate or death rate in childbearing women from causes other than puerperal. Generally speaking, the normal death rate in a country for a given age class should parallel the general or crude death rate (from all causes) in the same age class. It should be remembered that the maternal death rate in a certain country may be high partly because that country has a high general death rate in women of comparable age. It is in such a circumstance that the mortality rate due to pregnancy and childbirth *per se* has an important application.

In closing, let me state that the main object of this paper is the presentation of methods rather than the exhibition of death rates arising therefrom. It is hoped, at least, that the suggested scheme will stimulate a few individuals to further research. The author will gladly assist any workers who may have difficulty in applying actual data to the tables or equations for arriving at rates.

## REFERENCE

1. Lowrie, Robert J. The Maternal Mortality Rate Computed and Standardized by a New Method, *New York State J. Med.*, Oct. 1, 1931.

# Present Status of Handling Water Samples\*

## Comparison of Bacteriological Analyses Under Varying Temperature and Holding Con- ditions With Special Reference to the Direct Method

ELFREDA L. CALDWELL AND LELAND W. PARR, PH.D.

*Director and Chief Bacteriologist, Field Research Laboratory, Alabama State  
Department of Health, Andalusia, Ala.†*

ACCORDING to *Standard Methods of Water Analysis* of the American Public Health Association<sup>1</sup> the time required between collection of a sample for bacteriological analysis and the beginning of the analysis should not exceed 6 hours for impure water nor 12 hours for relatively pure waters; and during the period of storage the temperature should be kept between 6° and 10° C.; and any deviation from these limits should be so stated in making reports.

To determine to what extent and for what reasons deviations from this standard exist a questionnaire to each state and insular official<sup>2</sup> responsible for the water analysis of his particular area requested information on the use of ice in transporting and storing samples and the time elapsing between sampling and analysis. Fifty replies were received, only 2 insular authorities failing to respond.

Analysis of the replies indicates that the use of ice in the storage and transportation of water samples intended for bacteriological analysis is a rapidly declining practice. Fourteen states have given up the use of ice entirely, of which 5 are southern subject to fairly long seasons of summer heat, though none from the extreme South, and another after experimentation reports its intention to do so shortly. Including this state, only 11 state and insular laboratories reported the examination of iced samples only; 25 laboratories analyze both iced and un-iced samples, though in 6 of these the practice is tantamount to examination of un-iced samples. One or more of the following conditions govern the procedure in the other 19 laboratories:

- a. Iced when collected by the Board of Health; otherwise un-iced
- b. Iced in hot weather
- c. Municipal samples iced, private samples un-iced.
- d. Iced when not examined promptly.

The reasons given for the increasing use of un-iced samples may be resolved into the following points:

- a. With modern transportation facilities, because of their size some of the smaller

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

† Funds for the work of this laboratory are contributed by the International Health Division of the Rockefeller Foundation.

states and, through the establishment of branch laboratories, several of the larger states, feel that laboratory service has been brought within a few hours of all parts of the state.

b. Climatic conditions in some northern states preclude the need for ice.

c. Icing is expensive, often not practicable in remote areas, and frequently not carried out properly.

d. Un-iced mail samples have been found economical and practicable.

e. Many states do not ice if the analysis is carried out within 24 to 30 hours after sampling, since they consider icing necessary chiefly to safeguard the total counts on plates, which they omit except in certain technical controls.

No laboratory gave information as to the temperature of samples, iced or un-iced, at the time of analysis although several remarked that the use of ice had not been entirely satisfactory.

It is not improbable that the work of Berry<sup>3</sup> has considerably influenced this tendency toward the use of un-iced samples. He concluded:

The number of Colon group bacteria in samples of ground water did not change materially in the first 48 hours after collection regardless of whether the samples were kept at ordinary temperatures or packed in ice. Samples shipped without ice-packing will, therefore, yield dependable results and may be safely utilized where ice-packing is impracticable.

Not all the 50 laboratories answering the questionnaire gave information as to time elapsing between sampling and analysis, and many of the replies are open to misinterpretation. Of those making definite statements we interpreted that:

13 states begin analysis within 24 hours after collection

15 states within 48 hours

6 analyze samples sometimes 3 or more days old.

It is unquestionably true that despite modern transportation facilities, a considerable number of water samples are more than 2 days enroute and a large

number are not examined within 24 hours.

In the study of possible contamination of water supplies from latrines bored or excavated into ground water, it was important that the recovery of the test organism should indicate the true character of the ground water being tested. To minimize uncertainties due to the shipment of water samples, we adopted the "direct" method as standard. Samples were inoculated into lactose broth (3, 10 c.c.; 2, 1 c.c.; and 2, 0.1 c.c. volumes) and plated in Endo (1 c.c.) on the field immediately after collection of the test samples and examinations were completed at the Field Research Laboratory. Because of the large volume of work involved it was not possible to incubate the cultures immediately on the field. The time interval between inoculations and placing cultures in the incubator ranged from 15 minutes to 5 hours with an approximate average of 3 hours. Frequently atmospheric temperatures approximated 37° C. or were sufficiently high for growth. In any case direct inoculations served to fix the test volumes in culture before changes in water samples could occur.

*Methods Compared*—In view of the varying practices summarized in Part I, it seemed worthwhile to compare our findings by the "direct" method with analyses of samples collected at the same time but examined after being held for varying periods under temperature conditions representative of these procedures. Samples were, therefore, collected from the same source at the same time and treated as follows:

Direct (D), as indicated above

Iced (I), ice-packed when collected and examined within a few hours

Un-iced (U), held at atmospheric temperatures and examined simultaneously with the iced

Express-Iced (EI), ice-packed when collected and held for 24 to 30 hours before examination

Express-Un-iced (EU), held at atmospheric temperatures and examined simultaneously with the express-iced

There were 672 duplicate samples examined direct and iced only, and 316 by all 5 methods. Though occasionally iced samples were held for 7.5 hours, by far the greater proportion were examined within 4 to 5 hours. When atmospheric temperatures were high and the holding period brief, the final temperatures of the iced samples did not fall to 10° C., occasionally registering 13° to 15° C. The majority recorded less than 10° C. As frequently happens in the shipment of samples to central laboratories, in very hot weather the ice melted in 24 to 30 hours. The final temperatures of express iced samples were, therefore, higher at times than 10° C., in cold weather recorded a low of 4.5° C., and averaged 17.1° C. for quintuplicate examinations. Un-iced samples fluctuated from 15° to 36.2° C. The temperature of the ground water, varied from 16.5° to 25.0° C., averaging 19.9° C.

*Source of Samples*—We had the advantage of a more exact knowledge of our sources than is generally possible. The greater proportion of samples derived from pipe wells in our experimental fields afforded waters of varying quality: (1) good water, (2) yielding *B. aerogenes* (soil) from infected pumps,<sup>4</sup> and (3) receiving contamina-

tion or having been contaminated from experimental latrines. Group 4 includes a few samples from outside sources representative of water of poor quality contaminated from the surface and handling only—i.e., from shallow, unprotected dug and driven wells and surface waters.

*Method of Bacteriological Examinations*—In addition to *Standard Methods* for confirmed tests, the methyl red, indol and citrate tests were routinely employed to differentiate the colon-aerogenes group (hereinafter designated C-A) into 3 standard types—*B. coli*, *B. aerogenes* and Intermediates.<sup>5</sup> In a very careful search for *B. coli*, streakings were made from 2 dilutions at the end both of 24 and 48 hours, if gas production warranted. In general a minimum of 4 to 8 colonies were picked according to gas production in varying dilutions. The presence of anaerobes of the *Cl. Welchii* type was confirmed. *Pseudomonas* complications were controlled by successive re-platings. In the examination of Endo pour plates, colonies were grouped into (a) "C-A reds" and (b) "Others"—tiny whites predominating among the latter. Since 1 c.c. was routinely employed to obtain an accurate picture of C-A reds, when other colonies exceeded 1,000 in number they were not further estimated but recorded as > 1,000.

For simplicity we shall compare our

TABULATION A

Collections	#Samples	Method	Time in Hours		Temp. Water °C.		Maximum Air Temp.	
			Range	Ave.	Range	Ave.	Range	Ave.
185	672	D	0	0	16.0—19.5	16.7	11.0—28.0	22.0
		I	2.0—7.5	4.5	2.0—13.0	8.6		
64	316	D	0	0	16.5—25.0	19.9	19.0—45.6	28.7
		I	1.0—7.5	4.5	4.0—15.0	10.0		
		U	1.0—7.5	4.5	17.0—34.9	25.7		
		EI	24.0—30.0	27.8	4.5—25.0	17.1		
		EU	24.0—30.0	27.8	15.0—35.8	26.9		

findings in terms (1) of the recovery of the C-A group as a whole, and (2) of its component member, *B. coli*.

#### THE FINDINGS

*Direct and Iced Only*—Since it had not been demonstrated that the direct method was feasible or would offer any advantages over iced samples inoculated within a few hours and incubated immediately, 672 duplicate direct and iced samples were analyzed. The very low recovery of lactose fermenters (1.0 per cent) and absence of C-A reds on pour plate from 604 duplicate samples of good water indicated that direct inoculations were practical. Contamination of cultures or plates in the field was not apparent. The recovery in 68 samples from wells receiving contamination suggested also that direct examinations were advantageous. The iced samples afforded 68 per cent of the direct recovery of the C-A group as a

whole, and though a comparable number (95.5 per cent) yielded typical *B. coli* due to the gross contamination of receiving wells the C-A count on pour plate approximated only one-tenth.

*Quintuplicate Comparison*—Table I gives the numerical data for bacteriological analyses of samples in the different groups by the direct method, and compares the findings by the other methods in terms of the direct (percentage).

It is clear that in all groups the time interval before examination is of prime importance in the recovery of organisms of the colon-aerogenes group from water samples. Icing, though of secondary value, in general contributes definitely to recovery.

A. The direct method demonstrates its superiority by slightly higher gas production, significantly greater recovery of the C-A group as a whole, and notably higher yield of *B. coli*, evidenced not only by the greater

TABLE I

COMPARISON OF RESULTS OF BACTERIOLOGICAL ANALYSIS OF QUINTUPPLICATE SAMPLES UNDER THE CONDITIONS INDICATED

Group	Wells	Collections	No. Sam.	Method <sup>x</sup>	No. Gas pos.	No. C-A pos.	No. B.c. pos.	Pour Plate Data			
								No. pos. C-A Reds	Total Reds	No. pos. Others	Total Others <sup>†</sup>
1	6	7	54	D	0	0	0	0	0	31	1,678
2	4	7	55	Only occasional gas, no recovery of C-A group by any method.							
				D	26	25	0	10	132	40	3,302
				I	61.5	60.0	..	50.0	8.3	102.0	140.0
				U	73.1	68.0	..	60.0	10.0	130.0	204.0
				EI	57.7	52.0	..	20.0	6.0	100.0	122.0
3	17	31	184	EU	61.5	56.0	..	40.0	14.4	132.0	396.0 (2)
				D	162	124	93	84	8,960	182	44,670 (16)
				I	92.6	80.6	59.1	63.1	20.0	98.9	58.9 (16)
				U	98.8	56.4	49.5	61.9	17.0	99.4	77.6 (18)
				EI	88.9	38.7	43.0	36.9	10.8	95.1	73.6 (17)
4	15	19	23	EU	83.9	34.7	37.5	33.3 <sup>‡</sup>	12.8 <sup>‡</sup>	101.1	272.9 (92)
				D	20	19	8	15	639	23	3,615 (1)
				I	95.0	94.7	87.5	100.0	70.6	100.0	205.7 (5)
				U	90.0	94.7	75.0	80.0	52.6	100.0	205.2 (5)
				EI	80.0	84.2	75.0	100.0	71.0	100.0	218.3 (3)
Total	32	64	316	EU	90.0	94.7	50.0	100.0	205.8	100.0	285.3 (5)
				D	208	168	101	109	9,731	276	53,265 (17)
				I	89.8	79.2	61.4	67.0	23.1	96.4	75.2 (21)
				U	94.2	62.5	51.2	64.2	19.2	107.2	92.5 (23)
				EI	85.6	45.8	45.5	44.0	14.6	96.4	86.7 (20)
Total	32	64	316	EU	82.7	44.6	38.6	50.0 <sup>‡</sup>	44.8 <sup>‡</sup>	112.3	288.8 (99)

<sup>x</sup> Numerical data for D; I, U, EI, EU expressed in terms of D (percentage).

<sup>†</sup> Number in ( ) indicates plates showing counts greater than 1,000.

<sup>‡</sup> Discounting 29 counts from 124 plates in Group 3 not possible to indicate accurately.



percentage of positive samples but by the higher proportion of pour plates showing C-A colonies in greater numbers. There is progressively less recovery by other methods in the order: iced, un-iced, express iced and express un-iced.

B. Recovery from iced samples examined within a few hours is definitely and significantly greater than from the remaining 3 methods under the conditions of fecal or surface contamination usually encountered in the examination of water supplies. In handling samples yielding certain soil *B. aerogenes* only, icing apparently accelerates the death rate.

C. Though the difference in recovery of C-A organisms as a group from iced and un-iced samples held for 24 or more hours is slight, possibly because of the susceptibility of certain *B. aerogenes* to cold temperature, the yield of *B. coli* in favor of the express iced probably is significant.

Of special interest are the findings of 57 samples chosen from Group 3 from wells which, with 1 important exception mentioned later, had been consistently showing fecal *B. coli* derived from latrine contamination over a considerable period of time. With the exception of 1 sample showing gas due to anaerobes, the remaining 56 yielded *B. coli* upon direct examination in all samples, approximately 70 per cent in 1.0 c.c. or smaller volumes. The results are tabulated in Table II.

In these samples the standard iced method offered little better than one-half the direct recovery of *B. coli*, the un-iced express less than one-fourth, while the un-iced and express iced

yielded approximately 33.0 per cent. Pour plates from samples, iced or un-iced, yielded approximately one-fifth of the direct C-A count when inoculated within a few hours and less than one-tenth when samples were held from 24 to 30 hours. In the un-iced express samples the marked loss in red colonies, 4.0 per cent of the direct, is in contrast to the increase in "other" colonies which were more than twice as numerous.

Among these wells one (X) is of particular interest. In contrast to the others this had been giving good water for approximately 2 months while pumping 40 gallons. In withdrawing 240 gallons fecal *B. coli* were pulled into the well, recoverable in all samples tested, yielding 1 to 6 *B. coli* per c.c. in 4 out of the 5 samples by the direct method. In this significant situation typifying a well affording consistently good water which under unusual conditions yielded dangerous contamination, the other methods contributed samples positive for *B. coli*, in 10 c.c. volumes only, as follows: iced 3; iced express 2; un-iced and un-iced express 1 each. A second well of this group showing gross contamination with *B. coli* in all 5 samples by the direct method, yielded *B. coli* also by the other methods, but in significantly less numbers evidenced by C-A colonies on pour plates: (D) 583; (I) 101; (U) 27; (EI) 37; and (EU) 26.

TABLE II.  
COMPARISON OF BACTERIOLOGICAL ANALYSES OF SAMPLES FROM WELLS  
ALL RECEIVING FECAL CONTAMINATION

Wells	Collections	No. Sam.	Method <sup>x</sup>	No. Gas pos.	No. C-A pos.	No. B.c. pos.	Pour Plate Data			
							No. pos. C-A Reds	Total Reds	No. pos. Others	Total Others*
12	18	57	D	57	56	56	39	827	56	20,696 (13)
			I	100.0	71.4	55.4	48.7	20.9	101.8	109.8 (16)
			U	100.0	44.6	35.7	41.0	23.0	101.8	108.6 (16)
			EI	100.0	33.9	32.1	25.6	6.1	101.8	129.0 (14)
			EU	100.0	32.1	23.2	20.5	3.9	101.8	206.7 (37)

\* See Table I.

## DISCUSSION

These results emphasize the points stressed by *Standard Methods of Water Analysis* that "because of the rapid and extensive changes which may take place in the bacterial flora of bottled waters when stored even at temperatures as low as 10° C., it is urged as of importance, that all samples be examined as promptly as possible after collection." Our series serves to emphasize anew the probable process of loss of bacteria significant of dangerous contamination—a rapid death rate of fecal organisms, particularly *B. coli*, and an increase in associated organisms. The particular wells mentioned support the general findings that in the light of results from direct inoculations the death rate of fecal *B. coli* in bottled waters is very rapid even within a few hours. Our results indicate that in bacteriological analyses of water receiving undoubted fecal and perhaps dangerous contamination the loss of recovery even with the iced samples examined within a few hours approximates 40 to 50 per cent, and there is progressively greater loss as the time of holding increases whether samples are iced or un-iced. It should further be stressed that in the examination of our samples the procedures involved a more thorough search for fecal organisms than usual in public health laboratories, and it follows that our findings probably show greater recovery than would obtain in the analyses of the same samples under routine conditions. Unless samples are inoculated directly, our results indicate the need of icing when waters are receiving significant fecal contamination and suggest that the increasing tendency to send samples un-iced is open to question. Though practical circumstances may make examination of un-iced samples necessary or even advantageous in handling certain waters, it should be emphasized that the practice derives sanction from expediency and does not

conform in general to the conditions best for analysis.

## CONCLUSIONS

We have found direct inoculation feasible. There is no question of the marked superiority of this method under any and all circumstances. We believe that with samples collected by state employees, particularly from water supplies of small villages and towns without laboratory facilities, in areas where bus transportation is available to carry cultures and plates to a central or branch laboratory for incubation within a few hours, direct inoculations are practicable. In water plants serving municipalities having laboratories, direct inoculations at the various stations could readily be adopted.

## SUMMARY

An analysis of 50 replies received from state and insular laboratories indicates (a) that in most cases the procedure prescribed in *Standard Methods of Water Analysis* with respect to the storage and time of examination of water samples is not observed; (b) that a large number of water samples are not examined within 24 hours and a considerable number after 48 hours; (c) that ice-packing of water samples is rapidly declining. Comparison of recovery of colon group bacteria from iced and un-iced samples examined at varying periods indicates a very rapid death rate of *B. coli* in bottled samples of contaminated waters, which is progressively greater as the period of holding increases. Icing, though of secondary importance, offers a distinct advantage. Direct inoculations were found practicable and showed marked superiority over any other method. The feasibility of the direct method for municipal water supplies is suggested.

## REFERENCES

1. *Standard Methods of Water Analysis*, Sixth Edition, 1925, p. 101.
2. *Pub. Health Rep.*, 46, 49 (Dec. 4), 1931.
3. Berry, Fred. Studies on Lactose Fermenting Bacteria. *A. J. P. H.*, 16:700 (July), 1926.
4. Caldwell, E. L. and Parr, L. W. Pump Infection Under Normal Conditions in Controlled Experimental Fields, 1932. In press.
5. Koser, Stewart A. A New Differential Test for Members of the Colon Group of Bacteria. *J. Am. Water Works Assn.*, 12:200, 1924.

# Record Forms for Public Health Nursing

IN 1925 the Records Committee of the National Organization for Public Health Nursing drafted a set of nursing record forms so designed that the nurse might work with the family as a unit. The forms were put out with the understanding that they would be revised from time to time to meet the changing needs of the public health nursing field.

These forms have just been revised as a joint project of the American Public Health Association Sub-committee on Record Forms and the National Organization for Public Health Nursing Records Committee. As the forms are to be included as part of the standard forms for public health work to be recommended by the A.P.H.A. Sub-committee on Record Forms, the terminology and general set-up of the records conform to those of the other forms for reporting health work.

The plan of the 1925 Record System has not been changed in this revision; the record forms are again planned to enable the nurse to work with the family as a unit, and, in most instances, they are to be used with the family folder. However, individual records are so designed that it is not necessary to use the family folder and any record may be used by itself.

The significant features of the record forms are:

Provision for a definite content of visit by listing the conditions which must be watched in making an effective visit.

Provision for the minimum amount of writing by the nurse, by listing on the forms the items which may be checked, or by using a code suggested on the record, to give the desired information.

Provision for entering on certain forms, summaries of conditions found and care given, either when the case is closed, or periodically if patient is under care for a long time.

The Record System includes the following forms. An asterisk indicates those forms which have not been changed in this revision.

Index Card \*

Family Folder

Maternity Service

Maternity Record—AP-Del -PP - NB  
(double form)

Maternity Record (Prenatal Service)

Morbidity Service

Morbidity Record

Continuation—Morbidity

Record of Care \*

Tuberculosis Record

Tuberculosis—Record of Visit (double form)

Health Supervision Service

Child Health Supervision—Infant—Pre-school (double form)

Medical Conference Record \*

Extra Data \*

Nurse's Daily Report \*

School Service

School Health Record

School Nurse's Record of follow-up

Nurse's School Report \*

The following is a brief description of the various forms and of the revisions made:

*Index Card*—This is an individual identification card which is used to determine whether the individual is or has been under care.

*The Family Folder*—This form is designed to give a complete record of the family. The face of the form provides spaces for entering facts about the social history and the environment of the family. Certain items which are considered necessary only under special conditions are starred to indicate that information regarding these may not be entered for every case. The inside of the folder provides space for a summary of services given to individuals in the family.

It is recommended that a family folder be used for health supervision and when any social or economic problem is indicated. It may or may not be used when there is no social or economic problem.

The only revision on this form is the addition of certain items particularly applicable to rural areas.

*Maternity Service*—The *Maternity Record*—AP - Del - PP - NB is designed for use during the complete maternity period. Space is provided for entries during prenatal and postpartum care and for facts relating to delivery. Space is also provided for entries on care of the new-born infant during the postpartum care of the mother.

The principal revision in this form is the rearrangement of conditions to be watched for in making an effective visit. Some few items have been added.

The *Maternity (Prenatal Service)* is a new single form designed for agencies, especially health departments, which are interested primarily in prenatal care.

The set-up of this record is the same as that of the maternity record for complete care.

*Morbidity Service*—The *Morbidity Record* is to be used for care of illness; non-communicable and communicable other than tuberculosis. If used for communicable diseases, information required by health departments may be entered under remarks.

The *Continuation-Morbidity* is the same as the reverse side of the Morbidity Record.

The principal change in these two forms is the provision of definite space for entries under "Physician's Orders."

The form *Record of Care* sometimes known as "bedside notes" is to be left in the home and is used by all who are caring for the patient.

The *Tuberculosis Record* is intended for use in all diagnosed cases. It may

also be used for suspicious or undiagnosed adult cases. Such cases should be flagged or otherwise specially marked. Contacts and predisposed cases among children should be recorded on the special health record forms for their age groups, these records also being specially marked.

This form is planned to provide entries throughout the period of illness. Space is allowed on the reverse side for periodic summaries. Yearly summaries are recommended but the interval between summaries will vary according to type of case carried.

The *Tuberculosis Record of Visit* is to be used with the Tuberculosis Record and is a double form. The conditions which are to be watched in making an effective visit are listed and space is provided for supplementary notes on conditions, instructions and care given, and for physician's orders. The principal revision of these two forms is the provision for entries on information in relation to family and household contacts.

*Health Supervision Service*—The form *Child Health Supervision—Infant—Preschool*, is designed to be used for the health supervision of both infants and of children of the preschool age. Three forms, Child Health Supervision Record, Child Health Supervision—Infant—Record of Visits, and Child Health Supervision—Preschool—Record of Visits, have been combined in one double form. The periodic summary which was on the Child Health Supervision Record has been discontinued, as it was found to have little value in actual practice.

The first sheet of the new form provides space for identification data, disease experience, and for immunization and tests. Conditions to be noted in making an adequate visit are listed on sheets 2 and 3. The items listed included those applicable to the care of both infants and preschool children.

Space for physician's orders is provided on the 4th sheet. This form may be used either for visits in the home or for visits to a health conference.

The *Medical Conference Record* is for use of physicians at medical conferences. It is expected that a new form will be drafted by the A.P.H.A. Sub-committee on Records.

*Nurse's Daily Report Sheet*—This is planned to give a picture of the nurse's day and also to serve as a basis for making up the monthly and annual reports on staff activities. A revised draft is now being worked on by the two Records Committees.

*School Nursing Service*—The two forms, *School Health Record* and *Nurse's School Record of Follow-up*, take the place of the form on School Health Record. The revised School Health Record is designed to give a picture of the health of a school child over a period of years and a summary of the school nursing service in relation to the child. It is expected that this form will follow the child from school to school.

*The School Nurse's Follow-up* is designed for entries by the school nurse of her services in relation to the school child and for entries of facts regarding the health of the child during the period of a school year. It is intended that at least a yearly summary of this information will be made on the School Health Record. The School Nurse's Follow-up may then be destroyed.

The *Nurse's School Report Sheet* is designed to give a picture of the school nurse's day and also to serve as a basis

for making up monthly and annual reports on the nurse's activities in connection with schools. It is expected to revise this form at some later date.

#### GENERAL COMMENTS

The record forms just described have been published although they are not copyrighted. It is hoped that agencies in planning their own forms will follow the same general plan as the published ones so that public health nursing records throughout the country will tend to be uniform.

The published record forms, except for the Family Folder and Index Card, are on 5" x 8" bond paper. The index card is a light weight 3" x 5" card. The Family Folder is an 8" x 10" very tough manila folder which folds as a 5" x 8" container in which all the individual case records of the family may be kept.

The forms are available from Mead & Wheeler Co., 610 South Michigan Avenue, Chicago, Ill. The price list and a sample set will be sent directly by them to anyone on request.

#### *Records Committee of the National Organization for Public Health Nursing*

CARL E. BUCK  
MARY A. CLARK  
MABEL C. DEBONNEVAL  
ANNA A. EWING  
I. MALINDE HAVEY  
MRS. CARL POMEROY  
KATHARINE E. PIERCE  
MARION RANDALL  
MAUD STEEVES  
LOUISE M. TATTERSHALL, *Secty.*

#### *Ex-Officio*

SOPHIE C. NELSON  
KATHARINE TUCKER

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMAN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## DOES HEATING INJURE THE NUTRITIVE PROPERTIES OF MILK?

THE artificial feeding of children and infants is a necessity as well as an accepted fact, as is also the use of cow's milk for the purpose, to the practical exclusion of that of other animals. There are some who advocate the use of raw, some pasteurized, some boiled, and others dried milk, and all of these can give reports which are favorable.

In spite of the extensive literature dealing with almost every phase of artificial feeding and almost every type of milk, there is very little that can be used to make a fair comparison between raw milk on the one hand and heated milk on the other. Volumes have been written on pasteurized milk. Its value in the nutrition of children, in preventing gastrointestinal disturbances, and in stopping epidemics can certainly not be denied. Some experiments are entirely unfair; one, for example, in which a group of 122 infants fed on certified milk were compared with 112 fed on pasteurized milk, both milks having been boiled, is certainly not of much use, since the certified milk was of the highest quality, and the pasteurized of ordinary quality. An experiment on a large scale was done in 1930, in Lanarkshire, Scotland.<sup>1</sup> In this, 5,000 children were given raw milk and 5,000 pasteurized, all of the same grade originally. The investigators concluded that as far as growth, weight, and height were concerned, the results from the two milks were equal. The only clear conclusion which could be drawn from this work was the value of the milk ration in improving the nutrition of the children. The extensive coöperative experiment carried out in this country,<sup>2</sup> and reviewed in our issue of December, 1932, also showed, as far as it went, that there was practically no difference between the groups fed chiefly on raw milk, and those chiefly on heated milk, as regards the average heights and weights.

In regard to dried milk, which seems to be increasing in popularity, it can again be said that there are no experiments on record which enable us to make a clear-cut comparison between it and pasteurized or raw milk. The changes produced in drying are probably closely allied to those due to pasteurization, though the temperatures reached by the two processes in general use are probably higher than those ordinarily used in pasteurization, and may vary considerably. However, the testimony of experts who have observed the feeding of children with dried milk for many years is that there is no evidence of nutritional loss, so we must believe that the chemical changes do not have much clinical significance.

An unusually clear and judicial study of the question<sup>3</sup> points out, what is so well known, but often forgotten, that cow's milk is adapted for the nutritional requirements of calves—not children—and takes the ground that it is perfectly possible that the slight changes produced by pasteurization are beneficial to children rather than otherwise, making it more nearly like human milk. "There is nothing sacrosanct about the composition of cow's milk in relation to man."

The actual changes in milk produced by pasteurization are an increase in insoluble calcium of about 6 per cent, a reduction in the iodine content of about 20 per cent, and some destruction of vitamin C. Milk is not rich in vitamin C at best, though the amount is usually adequate for nutrition, but in actual practice, it is generally supplemented both for raw and pasteurized milk.

In considering the effect of these changes, it may be that pasteurized milk is not as suitable for certain animals whose calcium needs are greater than those of calves, but it seems there is no evidence that this is injurious to infants whose calcium needs are lower. The pasteurization of cow's milk brings it somewhat nearer to human milk as regards available calcium and phosphorus, and the change may be regarded as beneficial. Animal experiments as well as nutritional experiences on a large scale certainly give no support to the idea that pasteurized milk is in any way inferior to raw for infant feeding. These statements may not be entirely true for older children, since they require a greater amount of calcium for bone formation, and this is especially true for those who may be on a diet that is otherwise deficient in calcium, but apparently there is at present not much evidence on which to make such an assertion.

We have an immense volume of clinical evidence gathered from many countries which shows that pasteurized milk has fulfilled the needs for the feeding of infants and children over many years, with no evidence of damage, provided the possible loss in vitamin C is made good. The author above referred to holds that in view of this mass of clinical experience, it is up to opponents of pasteurization to demonstrate nutritional harm done by the process, and points to the fact that such experimental work as has been done proves that they have conspicuously failed to do so up to the present.

When we add to this the marked lessening of intestinal troubles and contagious diseases carried through milk, it is hard to understand how any opposition to pasteurization can be justified.

#### REFERENCES

1. Leighton, G., and McKinlay, P. L. *Report to Department of Health for Scotland, 1930.*
2. Frank, Leslie C., et al. Do Children Who Drink Raw Milk Thrive Better Than Children Who Drink Heated Milk. *Pub. Health Rep.*, Sept. 23, 1932.
3. Savage, William G., M.D. The Effect of Pasteurisation upon the Nutritive Properties of Milk. *Lancet*, Mar. 4, 1933, p. 485.

## COMMON SENSE IN HEALTH PROPAGANDA

PRESUMABLY everyone who has studied the question of health propaganda has realized that a certain amount of harm can be done by unwise health preaching. Many people are more or less ill balanced, and just as the medical student, according to the old saying, has for a while every disease which he studies, so do nervous persons suffer from imaginary dangers and diseases. This view is certainly not a new one, since many years ago it was held that writing concerning disease in ordinary language instead of in classical Latin would increase both real and imaginary illnesses.

For some years there has been no lack of medical and alleged medical information given to the public by the daily press. Many organizations which have done a vast amount of good have with the very best intentions put on campaigns for the instruction of the public. Periodical medical examinations have been urged by the highest authorities, and it is hard to doubt that they have had on the whole a good effect. On the other hand, it seems equally certain that some people have been frightened, and that there has been at least a tendency to make the public "disease-conscious."

Apparently the laity may very well question the sincerity of the medical profession in this movement. Though every doctor has capable professional friends always ready to give every examination possible free of charge, how many of them avail themselves of their opportunities? Do the wives of doctors suffering from cancer of breast, for example, come to the operating table sooner than other women? If not, why not? Many clinicians doubt the propriety and value of periodical medical examinations, though recognizing the value of early diagnosis, especially in diseases like tuberculosis, cancer and conditions characterized by albuminuria and high blood pressure.

A thoughtful and wise presentation<sup>1</sup> has recently appeared in which the ground is taken that in this matter of health propaganda, the practitioner and the health officer should work in closer coöperation. There is no question that many of the propositions put forward on this subject come from those who do not know sick people, whether or not they are graduates in medicine. The clinician on the other hand, and especially the old time family doctor, knows human nature and sick people as the laboratory man and the layman can never do, and his advice is correspondingly valuable.

Just how far it is advisable or wise to frighten a person depends largely upon the individual. No less an authority than Sir Thomas Horder has recently said, "Concern about high blood pressure is one of the chief factors in maintaining it, and this holds good whether the concern be on the patient's part or upon the part of the doctor." Another man of long experience has said that many young women are being frightened out of having children. This might have been understood before the days of antisepsis, and though even now maternal mortality is too high, generally speaking, child birth is reasonably safe.

Another instance is the propaganda for early diagnosis of cancer. Many people, especially women, spend their lives dreading cancer. Here there seems little doubt that the propagandists have exaggerated somewhat for the purpose of putting the point over, as well as enlisting the sympathy of the philanthropists in order to raise money for a purpose which unquestionably has a sound foundation.

Our local, state, and federal health authorities must continue to preach public



health and to give out interviews through the press and over the radio. These are now well recognized and widely practised procedures. We may well ask what effect they have had on the general health. The answer is that for most people it has been good, though we recognize that some phobias have been induced.

Many believe that the future control of contagious disease lies largely in prophylactic vaccination, and all over the world, efforts are being made to discover vaccines. Concerning these, when they are discovered, as well as for those for which vaccines are already known, there must be given to the public information accompanied by advice which may be so urgent as to partake somewhat of the character of compulsion. How should such a campaign be carried out? The highest success has been attained by enlisting the aid and coöperation of the family physician—in other words, the clinician. It is a matter of wisdom for the health officer to keep in close touch with those who reach the largest proportion of the population, to consult with them, and to accept their advice. Any antagonism which may be aroused seriously injures the cause which the health officer has at heart, and may result in a large degree of failure, not only for that particular scheme, but for others of like character elsewhere.

## REFERENCE

1. Barber, Hugh, M.D. Clinical Wisdom and Health Propaganda, *Brit. M. J. Supplement*, Oct. 8, 1932, pp. 196-197.

DEFEAT OF PASTEURIZATION IN MANCHESTER,  
ENGLAND

FROM England comes the news that Manchester by popular vote has rejected the compulsory pasteurization of milk. An English journal<sup>1</sup> says that only 13.2 per cent of the electors voted, and yet we are told that this was the heaviest balloting ever recorded on a vote of this description. The editor makes very strong comments on the futility and foolishness of submitting any question of public health to the popular vote, saying very properly that the public is not in a position to understand such matters, not having been trained technically to deal with them. He holds that the Public Health Act of 1875, which is generally regarded as one of the finest pieces of public health legislation ever enacted in the world, would have failed of passage if the provisions had been submitted piecemeal to popular vote, and feels that even today most of them would be rejected if subjected to such an ordeal.

The Manchester Corporation Bill provided that all milk other than certified and Grade A (Tuberculin-Tested) coming into the City should be pasteurized. It is stated that 75 per cent of the milk supplied to Manchester is already pasteurized, that the City Council issued 350,000 explanatory leaflets for the education of the public, and that 323 children are infected with bovine tuberculosis every year, at a cost for treatment to Manchester of \$90,000. In 1929, of a total of 1,133 samples of milk, 111, or 9.8 per cent showed tubercle bacilli. Of mixed milk samples from 697 farms examined during the same period, 88, or 12.62 per cent gave positive results. The corresponding figure for London in 1929 was 7.5 per cent. We have learned from the People's League of Health, as well as from other sources, that some 40 per cent of the herds in England react to the tuberculin test, that 2 per cent of the milch cows have tuberculosis of the udder, and that 14 per cent of market milk yields living tubercle bacilli.

Against such facts, the argument was used that compulsory pasteurization would drive the small producer out of business, that children prefer raw milk, and that it is more nutritious, since pasteurization precipitates calcium and destroys the vitamins. In the face of this, we have a declaration from the Minister of Health that pasteurization "ensures a milk which is not only safe but also retains its food value practically unimpaired." The Public Health Committee of the Town Council approved the Bill submitted and apparently did all they could to have it passed.

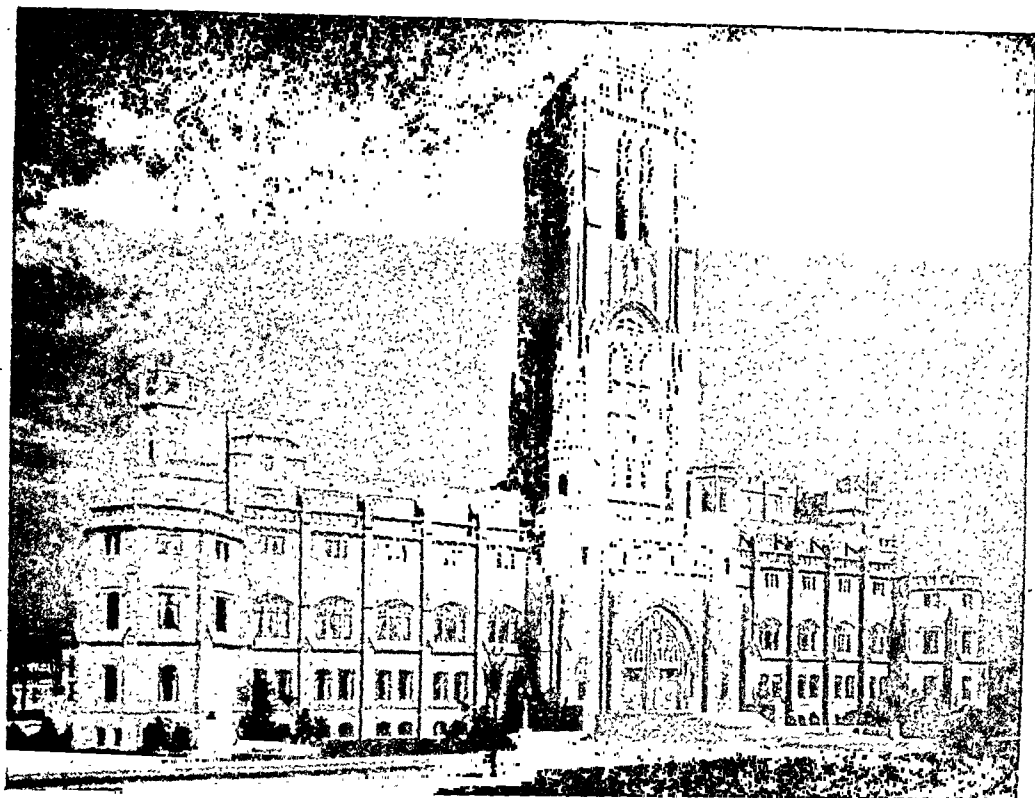
In a scathing editorial, the publication referred to<sup>1</sup> makes the statement that if the voters had possessed the requisite technical knowledge, their vote would have been one of censure not only of the health committee, but of their official adviser, the medical officer of health. We are told further that the great majority of distributors in England are now in favor of pasteurization, and that two of the large associations are made up almost entirely of those who pasteurize milk. However, what is described as a small minority was enabled to defeat this measure for the protection of the public, and the Corporation of the City has no alternative than to accept the verdict of this poll.

In 1899, the Corporation of Manchester obtained the passage of a Local Act which gave them power for the control of milk produced outside of the City and suspected of being infected with tubercle bacilli. The "Milk Clauses" were later incorporated in about 100 Local Acts which enabled the authorities to trace infected milk back to the farm from which it came, and to prohibit the sale of milk from animals in such areas. In 1914,<sup>2,3</sup> these Local Act clauses were repealed, and in 1915, reënacted in the Milk and Dairies (Consolidation) Act, the enforcement of which was postponed on account of the World War until 1925. The procedure finally adopted seems rather cumbersome, but unquestionably protects the public as well as the dairyman. That it was not satisfactory is shown by the figures quoted concerning tuberculosis, by the apparent necessity for the election just held, and by the statement,<sup>2</sup> "The Manchester Clauses and the provisions of the Milk and Dairies (Consolidation) Act, 1915, which superseded them, appear to have had but little effect upon the incidence of bovine tuberculosis or the sale of tuberculous milk."

There seems to be little doubt that America has progressed further than England in regard to the handling of milk, though apparently we have much less tuberculosis in our herds. Nevertheless, in various parts of the country, fights are being made on the tuberculin testing of cattle as well as on the pasteurization of milk. Indeed, there is an association which is spreading propaganda for the use of raw milk as against pasteurized, in spite of the many proofs of the benefits of pasteurization to the safety and health of the people, especially infants, children and invalids.

#### REFERENCES

1. *Med. Off.*, Feb. 11, 1933, p. 52.
2. A Memorandum on Bovine Tuberculosis in Man, with Special Reference to Infection by Milk. *Reports on Public Health and Medical Subjects*, No. 63, 1931. Ministry of Health. London: His Majesty's Stationery Office.
3. Porter, Charles, and Fenton, James. *Sanitary Law in Question and Answer*. London, 1932.



*The Scottish Rite Cathedral*

## INDIANAPOLIS

A.P.H.A. CONVENTION CITY FOR 1933

INDIANAPOLIS, the capital city of Indiana, is situated in the heart of the United States. Its accessibility makes it an ideal location for the Sixty-second Annual Meeting of the Association.

Indianapolis has innumerable points of interest and an historical background of unusual significance to the visitor. The first thing one notices in the downtown district, the Cross-roads of the Nation, is the Soldiers' and Sailors' Monument in the Circle. Erected shortly after the Civil War on the site of the home of the first governor of Indiana, this fine dignified shaft, which is second in height only to the Washington Monument in Washington, is the axis around which the rest of the city rotates, and the observer will note other points in which the city resembles

in appearance and character the national capital. Like the City of Washington, Indianapolis was not born; it was legislated. Seven years after the admission of the state of Indiana to the Union, Indianapolis was selected as its capital, and was surveyed by a competent engineer who had assisted in planning the City of Washington.

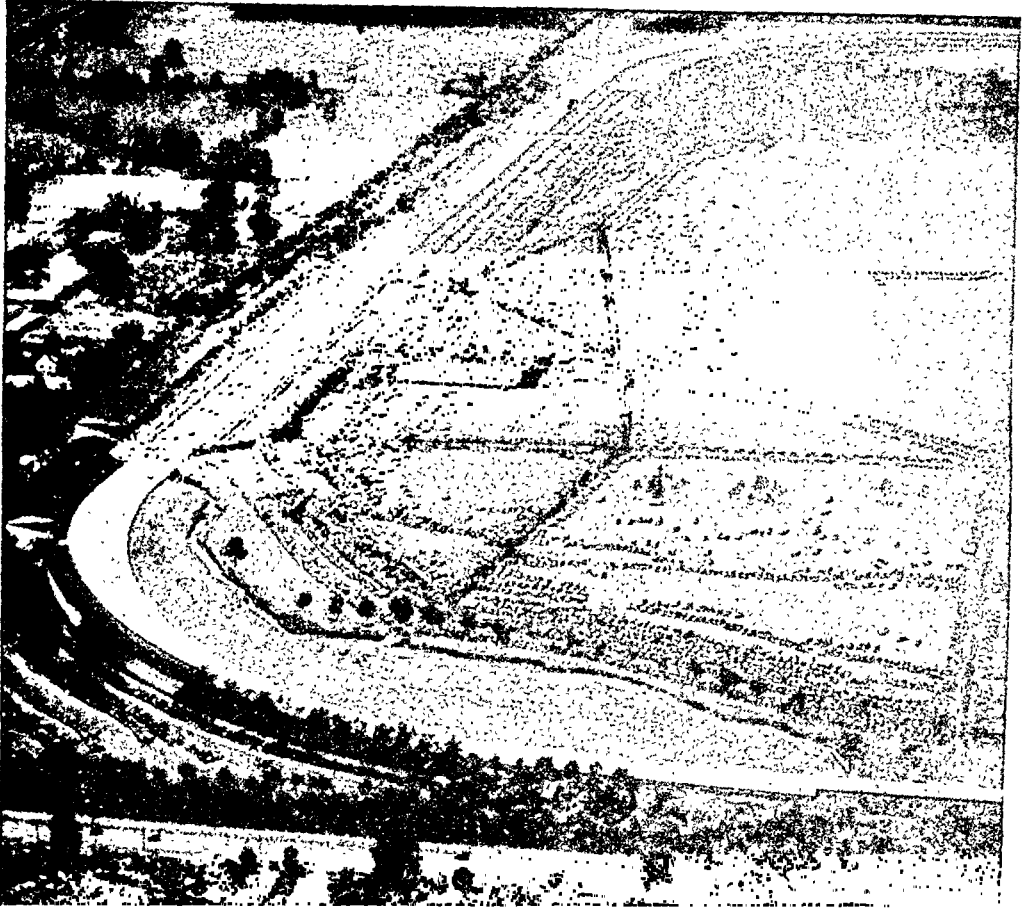
Quite the outstanding landscape and architectural feature to be observed from atop the Monument at the present time is the massive structure that has been completed in the center of five downtown city blocks, the Memorial Plaza to Indiana's participation in the Great War, which involves the expenditure of approximately fifteen million dollars. The Memorial proper is a square shrine with a pyramidal dome ninety-six feet high.

Indianapolis is the home of Booth Tarkington, celebrated author and playwright, and Meridian Nicholson, whose fame is equally widespread. William Herschell, the "Indiana Poet," claims Indianapolis as his home, and, too, Indianapolis holds the Shrine to which thousands of children and grown-ups make pilgrimages, the home of the poet, James Whitcomb Riley. It is a modest red brick house on Lockerbie Street, a stone's throw from the Murat Temple and Theatre, one of the largest Masonic structures in the United States. The house contains the furniture which he had used, and his unpretentious, book-lined study recalls memories of his oft-repeated works. The house has been set aside as an Indianapolis institution, and is being preserved to posterity.

Architecturally, Indianapolis ranks among the first cities of the land. The Public Library is conceded to be quite the finest example of severe Greek architecture in America. The Federal Building, which occupies the entire block between New York, Pennsylvania, Ohio, and Meridian Streets; the City Hall, the new Chamber of Commerce Building, facing University Park; the new National Headquarters of the American Legion in the Memorial Plaza; the Indianapolis Athletic and Columbia Clubs; and the National Guard Armory; these and some of the finer business buildings, banks and hotels are far above the level of the usual municipal architecture. The Scottish Rite Cathedral has attracted international attention as a reproduction of Old World architecture. The



*Home of James Whitcomb Riley*



*Indianapolis Motor Speedway*

interior is as striking as the exterior. Its central tower is equipped with Carillon bells which are said to be among the finest in America.

Indianapolis has devoted much time and money to the development of an elaborate park system. The Taggart Riverside Park and Garfield Park are worthy of particular attention. The latter's sunken gardens, with their varicolored illuminated fountains, are of great interest to visitors.

Ten miles to the north of the city is Fort Benjamin Harrison, the United States Army Post, which now houses the troops of the 11th Infantry and an aerial squadron; and approximately five miles to the north and west is the Indianapolis Motor Speedway, the greatest track in the world. The Speedway is a two-and-one-half mile brick oval and is to motordom what Churchill

Downs is to lovers of the Derby. It is the scene each Memorial Day of the 500-mile sweepstake which has been responsible for more advances in motor development than any other influence.

Indianapolis has a population of approximately four hundred thousand people. More than two million people live within two hours' ride of it, and more than sixty million more can reach the city over night. The railroads have provided through pullman service from practically every railroad terminal of any size in the United States. Seventeen steam lines, and more than a score of bus lines converge here. Indianapolis acts as a hub to a number of trunk lines including the C. I. & L., Big Four—New York Central, Pennsylvania, B. & O., Illinois Central, and the Nickel Plate Railroads.

Indianapolis is as easily accessible by

automobile as by train. It is the intersection of two transcontinental motor-ing routes of the United States arterial highways systems and the converging points of a number of hardsurfaced national and state roads. The state of Indiana, as a whole, has long been known for her wonderful highway system and has acquired the title of "The Tourists' Paradise." The trans-continental routes are the National Old Trails Road from Washington, D. C., to Los Angeles, and the Pikes Peak Ocean to Ocean Trail from New York and Philadelphia to San Francisco.

There are many things of scientific interest to the health worker in Indianapolis. They will be covered in detail in a subsequent article.

State and local officials are already preparing to receive delegates to the Sixty-second Annual Meeting, October 9-12. They unite in a hearty invitation to members of the Association, their families and friends to attend.

The Local Committee in Charge of Arrangements is an impressive group of medical, health, civic and social leaders all pledged to make the Indianapolis Annual Meeting memorable.

## LETTER FROM GREAT BRITAIN

### THE FIRST LINE OF DEFENCE

Though here, as elsewhere, the central government health department, the Ministry of Health, is responsible for the conduct of international health relations, ever since 1875, when the line of organization was laid down, the local authorities of the ports actually serve as the first line of defence against the entry of infection.

Sir John Simon, commonly regarded as the founder of the system now in operation, even though for long an officer of the central department, always held that safety would best be secured by leaving the work in the hands of the local authorities, empowering them to make all the necessary provision in the shape of hospitals, etc., the responsible minister issuing from time to time such rules, orders, and regulations for their guidance as appeared to be required. Power to the health minister to make orders, etc., alone or in consultation with other departments—the Admiralty, the Foreign Office, etc.—was given in the Public Health Acts.

At intervals new regulations have

appeared incorporating new views, the result of progress or based upon decisions arrived at in international conventions, and so on, and the authorities at the ports and their officers have carried them out most effectively and efficiently.

The most recent to appear are the Port Sanitary Regulations, 1933. These were issued about the middle of February, and come into operation on May 1, 1933. Intended primarily to replace and consolidate certain orders and regulations made from time to time between 1907 and 1929, they include also provisions for carrying out obligations assumed under the International Sanitary Convention of Paris, 1926, for preventing access of rats to ships, and for the control of persons embarking in outward-bound ships who are suffering from infectious disease or who have been in such relations with persons so suffering as to render them liable to transmit the disease. Modern methods of international interchange of information relating to epidemic diseases are taken into account, and special measures are prescribed for

dealing with ships infected with typhus fever and smallpox, in addition to those infected with plague, cholera, or yellow fever, three diseases to which for long special regulations have applied. In addition to imposing duties upon the authorities, the regulations also lay down those to be performed by ship masters, customs officers, and the medical personnel of the local authorities at the ports.

The arrangements under which persons aboard foreign-going ships found to be infected on arrival are permitted to proceed to their destination, on providing particulars as to their movements and the address to which they are proceeding, for the information of the health officer of that area, are continued. Having regard to the fact that this system has proved eminently workable and a perfect alternative to quarantine of the older type, it is not surprising that it should have been continued.

#### VOLUNTARY MEDICAL AND SURGICAL SERVICES IN LONDON

A report of a survey of medical and surgical services in London, undertaken jointly by the London Voluntary Hospitals Committee and the London County Council, recently issued, contains an amount of information of distinct value and interest. The first part, for which the former body is responsible, contains reference not only to hospitals but to voluntary clinics and dispensaries.

So far as hospitals are concerned, these are divided into four groups: teaching hospitals (St. Bartholomew's, Middlesex, Guy's, etc.); other general hospitals containing a hundred beds or more; those containing less than 100 beds; and special hospitals.

In all, in the voluntary hospitals there are 14,833 beds. The total number of new in-patients treated in the year 1931 was 216,788. Of these, and

in respect of whom information is available, 134,752 came from within the county of London, and 79,385 from outside the county. The proportion from outside the county is naturally greater in the case of the teaching hospitals, namely, from inside the county 59,307, and from outside 36,740. The same is true of the special hospitals, with 46,385 from the county, and 29,702 from outside.

The population of the county of London in 1931 was 4,397,003. The population of Greater London was 8,202,818.

Some indication of the work done in relation to in-patients is given by the fact that the voluntary hospitals have 239 operating theatres, and in one year 123,312 operations were performed on in-patients. New out-patients amounted to 1,596,361, and the total out-patient attendances in 1 year was 8,355,756, a number greater than the population of Greater London.

The information collected with regard to voluntary dispensaries is difficult to summarize, but speaking generally there appears to be in the London area a quite astonishing assortment of institutions of this type and very ready of access, more particularly from the poorer quarters in the different areas of the metropolis.

*Municipal Hospitals, Clinics and Dispensaries*—In part II, which treats of municipal hospitals, clinics and dispensaries, it is shown that in regard to the two last-named, the metropolitan borough councils have not been ungenerous, the provision including, in addition to tuberculosis dispensaries, infant welfare clinics, and such like standard institutions, clinics, for a wide variety of other purposes—diphtheria prevention, massage, etc.

So far as hospitals are concerned, the survey (part II) gives detailed information of the medical, surgical and other services provided in 1931 by the

council at the 79 general and special hospitals, convalescent hospitals, institutions and other places with beds for patients, and the 49 dispensaries (out-door medical relief stations) under the management of the central public health committee of the council; at 8 of the 13 institutions under the management of the public assistance committee, in which are accommodated, for the time being, a number of chronic sick and other cases; and at the 20 mental hospitals, colonies, homes and institutions for the mentally defective under the management of the mental hospitals committee.

The number of beds for sick persons in the council's hospitals and institutions (apart from mental hospitals) on December 31, 1931, was 38,945. The total number of new in-patients treated in the year 1931 was 201,899. The total number of in-patients treated, based on discharges and deaths, in the year (excluding one convalescent hospital for which the figures are not available) was 210,074, of which all but 5,535 were resident in the county of London. New out-patients in 1931 (excluding special hospital cases) numbered 44,450, and the total out-patient attendances at all hospitals in the year was 259,036.

The total number of beds in the council's mental hospitals, colonies, homes and institutions under the management of the mental hospitals committee was, on December 31, 1931, 32,265.

#### *Home and School Medical Services*

—In addition, there is provided a district medical service (*i.e.*, medical attendance on the sick poor who are not in receipt of indoor medical relief) and medical inspection and treatment for school children. The former is carried on by 100 part-time district medical officers and, in 19 of the 119 districts into which London is for the purpose divided, by whole-time officers of the

staff of the council's general hospitals.

Patients are visited in their own homes by the district medical officers or seen by them at the 49 medical relief stations, or, in 21 districts, at the private surgery of the district medical officer. The number of domiciliary visits paid by district medical officers during the year 1931 was 65,604, and the number of attendances of patients at medical relief stations during the year was 257,910.

The council's scheme for school children includes agreements with voluntary committees, who have, at the instance of the council, provided 73 treatment centers, and with the authorities of 17 voluntary hospitals. The numbers of children treated under these arrangements in 1931 were, for minor ailments 106,072, for vision 44,686, for defects of the ear, nose and throat 20,703 (16,243 operations), and for dental defects 139,723, a total of 311,184.

The two parts of the survey bring into focus the whole of the hospital and associated provision made by voluntary agency and public authorities for the population of London. More important still, largely as a result of the setting up of the voluntary hospitals committee and the making of the survey, there has come about a better understanding between the two bodies, with promise of a greater degree of coöperation in the future with growth of mutual knowledge, and a mutual appreciation of the needs of each system.

One most important development, of which there are already indications, is that there will be made available for teaching purposes a great deal of the material in the municipal hospitals which the clinical teachers, if in fact they knew of its existence, formerly considered entirely out of their reach.

CHARLES PORTER, M.D.

*London*



# ASSOCIATION NEWS

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

- Horace E. Duncan, M.D., Court House,  
Dallas, Tex., County Health Officer  
Frank J. Jirka, M.D., 3202 W. 22 St., Chicago,  
Ill., Director of Public Health of Illinois  
Eli M. Morehouse, M.D., Yankton, S. D.,  
City Health Officer  
Robert R. Robinson, M.D., 204 S. Garth  
Ave., Columbia, Mo., Boone County Health  
Officer

### *Laboratory Section*

- Louis H. Burgwald, B.Sc., Ohio State Uni-  
versity, Columbus, O., Instructor in Dairy  
Sanitation  
Arch H. Morrell, M.D., 18 Weston St.,  
Augusta, Me., Director, State Diagnostic  
Laboratory  
Carl Wilson, D.Sc., 207 S. Broadway, Los  
Angeles, Calif., Director of Sanitation,  
Department of Water and Power

### *Public Health Engineering Section*

- Robert N. Clark, C.E., 74 Eiseeman Ave.,  
Kenmore, N. Y., Sanitary Engineer  
Charles D. Yaffe, M.S., 2830 Grant Ave.,  
El Paso, Tex., City Sanitary Engineer

### *Food and Nutrition Section*

- Davis W. Fountain, City Dairy Dept., City  
Hall, Phoenix, Ariz., City Milk Inspector  
Mrs. Gustavo Saliva Soria, Box 38, Marina  
Station, Mayaguez, P. R. (Associate)

### *Child Hygiene Section*

- Frederick L. Patry, M.D., State Education  
Dept., Albany, N. Y., Neuropsychiatrist

### *Public Health Education Section*

- Mary S. Close, A.B., High School of Com-  
merce, San Francisco, Calif., Science  
Teacher  
Harry L. Hopkins, 386 Fourth Ave., New  
York, N. Y., Director, New York Tubercu-  
losis and Health Association  
Katherine Sarabia, S.B., Massachusetts Inst.  
of Technology, Cambridge, Mass., Research  
Assistant in Health Education

- Elvessa A. Stewart, A.B., Manila, P. I., Chief,  
Dept. of Home Economics, Bureau of  
Education.

### *Public Health Nursing Section*

- Alice F. Mitchell, Colchester, R. F. D., Conn.,  
Secretary, Salem Public Health Nursing  
Association  
Nora Moore, 22 Prince Arthur Ave., Toronto,  
Ont., Canada, Acting Director of Public  
Health Nurses, Dept. of Public Health  
Grace W. Pinckney, R.N., 608 City Hall,  
Omaha, Nebr., Supervisor of School Nurses  
Carolynn S. Whiting, R.N., P. O. Box 78,  
Phoenix, Ariz., Public Health Nurse

### *Epidemiology Section*

- John E. Laxton, M.D., D.P.H., Dept. of  
Public Health, City Hall, Toronto, Ont.,  
Canada, Director, Division of Com-  
municable Disease

## DECEASED MEMBERS

- Howard A. Lanpher, M.D., Des Moines, Ia.,  
Elected Member 1923, Fellow 1932  
Charles B. Maits, M.D., Pittsburgh, Pa.,  
Elected Member 1929, Fellow 1932  
Harry K. Read, M.D., Houston, Tex.,  
Elected Member 1928, Fellow 1931  
C. A. Shore, M.D., Raleigh, N. C., Elected  
Member 1909, Fellow 1923  
Leonard M. Wachter, Albany, N. Y., Elected  
Member 1906, Fellow 1922  
Albert L. Brannock, M.D., Pontiac, Mich.,  
Elected Member 1925  
Margaret M. Butler, Chicago, Ill., Elected  
Member 1928  
Louis Cantor, Jerusalem, Palestine, Elected  
Member 1926 (Associate)  
Anton J. Cermak, Chicago, Ill., Elected Mem-  
ber 1926  
A. A. Crooks, M.D., Peoria, Ill., Elected  
Member 1925  
Charles R. Grandy, M.D., Norfolk, Va.,  
Elected Member 1907  
Sylvan McElroy, M.D., Orlando, Fla.,  
Elected Member 1927

# PUBLIC HEALTH ADMINISTRATION

## HEALTH DEPARTMENT REPORTS

THIS section received more annual reports for 1932 during the first two months of the new year than heretofore. One of the values of the annual report depends upon its timeliness, hence the tendency for early issuance of these documents is commendable. While some of these reports have occupied less space than formerly and have omitted some of the routine statistical tables, they have in general been more carefully planned and more interesting to the average reader. Among the early reports are those for Colorado Springs, Detroit, Palama Settlement (Honolulu), Palo Alto, Pasadena, Middletown, O., Lincoln, Neb., Steubenville, O., Chicago, Peoria.

Colorado Springs—While an increase in the general death rate for the city is noted for 1932, this did not occur in tuberculosis nor in other common communicable diseases. The greatest increase was noted for the circulatory diseases, followed by certain respiratory diseases. Infant mortality was somewhat higher in 1932 than in 1931, the infant deaths from prematurity being most marked. There were 3 cases of diphtheria with no deaths in this city of 33,237. One of the increased problems associated with the depression is said to be that of supervision of the milk supply and of preventing the sale of "bootleg" milk. Increased efforts were necessary to discover and inspect the establishments of unlicensed milk dealers.

Palama Settlement, Honolulu—In Honolulu, the health and welfare center, known as Palama Settlement,

maintained its watchword of "Prevention as well as cure" in 1932 and adopted the goal of "more work at less cost." Palama public health nurses increased home visits to 45,708, almost 9,000 more than in 1931. The doctors and dentists treated 78,629 cases, an increase of more than 11,000 over 1931. The newly organized Tuberculosis Committee carried the message of prevention to tens of thousands of island residents on Oahu, Maui, and Hawaii.

One-seventh of the energies of this center is devoted to recreation and the department served 15,000 of all ages. These services include: club activities, boy and girl scouting, home-making, physical education, swimming, athletic leagues, and social dancing. The center reached through all its services 200,000 during the year. An attractive, beautifully illustrated 4-page report tells the story.

A more detailed report of dental services shows that the Strong Foundation contributed some \$30,000 to provide high grade dental treatment to 6,552 children, representing 57,396 treatments. These were children attending the first 5 grades of the public schools whose parents were unable to pay for private dental care. There were also 7,155 elementary public school children in the city who were under the care of private dentists. Only 6,184 children received no dental care. On the average, the cost of complete dental care per child, necessitating 3 visits each, was \$4.01.

Palo Alto, Calif. — In presenting his 1932 report to the Board of Public Safety, the Health Officer of Palo Alto

made the following significant comments:

Those activities which make for economy and efficiency possess the greatest opportunity to survive the readjustments through which governmental agencies are passing. True economy consists not so much in minimal outlays as expenditures that constitute sound purchases or investments. Often false economy results from failure to make the proper expenditure. . . . The best investment the community can make is in itself, its children, mothers, and citizens. . . . The city of Palo Alto has definitely been engaged in the public health business since 1910 when the full-time department was started. Each year since that time she has invested certain sums of money in her citizens in the shape of appropriations to the health department. The returns on these investments are set forth definitely and unmistakably in the annual reports of the department.

For the period 1910-1932, the average infant mortality rate was 41.6, or about half that for the state, and in 1932 the rate was 20.5. About 58.6 per cent of the school children and most of the babies have been immunized against diphtheria. There has been but 1 death from diphtheria since 1911 and none since 1921. A high grade milk supply is provided, with no milk-borne disease recorded in years. Laboratory service is available through the coöperation of the Palo Alto Hospital and the Health Department.

In 1931, Palo Alto was again an honorable mention city in the U. S. Chamber of Commerce Health Conservation Contest. Expenditures for health by all agencies amounted to \$1.30 per capita. It is observed that the 5 honorable mention cities in California expended in 1931 an average of \$1.94 per capita for health as compared with \$1.12 per capita for the 13 cities in the state in the contest which did not receive awards.

Pasadena, Calif.—The 1932 Health Department report of 103 mimeographed pages is well prepared and effectively illustrated. Reports of

coöperating agencies as well as of the Health Department are included, Pasadena has obtained honorable mention each year in its population class in the annual Health Conservation Contest of the U. S. Chamber of Commerce. The infant mortality rate of 34.9 and the maternal mortality rate of 3.7 are worthy of note. In connection with prenatal care, an arrangement has been made with attending physicians and local hospitals to furnish Wassermann tests without cost. Four conferences on maternal and prenatal care are maintained in this city of 80,000. During the year a careful study of the maternal care service was conducted and a community program was developed with the social agencies.

A survey conducted by the Los Angeles County Welfare Department, in which area Pasadena is located, indicates that there has been an increase of 30 per cent in the incidence of tuberculosis among persons under welfare care since the depression. The city tuberculosis program, through coöperation of several agencies, meets *Appraisal Form* standards.

The report calls attention to the work of 26 members of the Woman's Civic League who served as deputy food and milk inspectors without compensation during the year. Another interesting feature of the report is the rating schedule of the U. S. Chamber of Commerce properly filled out for Pasadena.

Detroit, Mich.—Under the title *Public Health in a Year of Stress* appears Detroit's annual Health Department report for 1932. That a new low general mortality rate of 8.7 and a new low tuberculosis rate of 70.3 were established, together with freedom from smallpox, is noteworthy. The diphtheria death rate of 4.3 is contrasted with that of 6.3 for 1931. There were but 57 cases and 9 deaths from typhoid fever, giving a death rate of 0.6. Also

commendable is the infant mortality rate of 52.3, which is less than half of the rate for 1920.

The question may well be asked as to why health conditions have been so good. It is true that, by and large, the death rate throughout the United States has reached a new low figure. Health departments have materially expanded their services during the past two decades; have extended their activities in the prevention of such diseases as smallpox, typhoid fever, and diphtheria, for which known prophylactic means are available; and have extended their activities to find the early case of tuberculosis, provide adequate diagnostic facilities, search for contacts and provide more adequate hospital and sanatorium facilities for known cases. Detroit now has two hospital beds for tuberculosis for each annual death and for the first time the list of those seeking admission has been eliminated. Health education has brought the message of positive and vigorous health, the value of the periodic health examination, and the need for early and prompt diagnosis to the attention of our citizens. It has taken years to stimulate this interest in positive health habits and it is reasonable to conclude that this widespread educational influence cannot be destroyed over night. In 1932 we continued to reap the benefit of the public health program which had been constructed during the past 20 years. The health of a community reflects the personal health of the individuals who constitute that community and the death rates are an indication of the health consciousness of our citizens. By force of circumstances many people have been deprived of those luxuries and extravagances of life which create over-indulgence and are not considered essential to health and well-being. They have been conserving those fundamental principles which assure a good health tone. Furthermore, the past year has been free of those epidemic diseases for which public health administration does not possess precise means of control. There has been no widespread outbreak of influenza with complicating pneumonias. We have lived more sensible lives with no excesses due to over-work and our daily habits have been seasoned with reasonable amounts of recreation, lack of over-indulgence in unnecessary foods, and freedom from excessive extremes in our mode of living. Briefly then, our new health record may be attributed to a general understanding of the principles of hygienic living coupled with such prophylactic services as are at our disposal and blessed by the

absence of epidemic disease concerning which we know little.

In January, in order to balance the budget for the fiscal year, it was necessary to make certain curtailments in the program. It was deemed advisable to conserve those services which deal with the control of the acute communicable diseases, tuberculosis, and the venereal diseases, and the promotion of positive health for the mother, infant, and young child. As cuts in service became inevitable it was decided to curtail those activities which pertain to the higher age groups, especially those activities which might be replaced through the coöperation of other agencies. Consequently, the school dental service was eliminated in January with the exception of the director. The service has been maintained through the aid of the District Dental Society by 300 dentists who volunteered to conduct the dental examinations in the schools and by 60-some dentists who have manned certain of the treatment clinics. In October, the Children's Fund of Michigan appropriated \$25,000 for dental relief and since that date has given emergency dental service in school clinics.

In January, the paid physicians who had conducted the physical examinations in the schools were eliminated and this service has been continued by the Wayne County Medical Society, which through an appropriate committee has officially joined hands with the Board of Education and the Department of Health in providing such examinations. One hundred physicians have donated their services and are giving on an average of one morning each second week. This work is directed through the County Medical Society by the director of the School Health Service who is still employed by the Department of Health on a full-time basis and likewise serves as secretary of the special committee of the medical society. Thus, these two services which by force of circumstances have been eliminated from the health department budget have continued to operate through the generosity of the physicians, dentists, and the Children's Fund of Michigan.

There have been no other major curtailments in service. The communicable disease activities have been maintained at full strength. The tuberculosis and venereal disease clinics have carried a heavier load than heretofore and there has been no relaxation in the services in maternal and infant hygiene. In August, all municipal departments were placed on a 5-day work plan, the employees engaged for 5 full days of the week, the majority not working on Saturday. The Health Department has, however, continued

to function 7 days of the week, those who are employed on Saturday and Sunday being granted appropriate relief on other days. The first curtailment in compensation was made in January with a reduction of 10 per cent in wages and for all receiving more than \$4,000 annually, an additional 10 per cent. With the inauguration of the 5-day plan in August, an additional 14½ per cent reduction in salary went into effect. These reductions are carried in the budget as a salary suspension, there having been no reduction in the basic salaries. The public health nursing service of the department, so essential to efficient work, has been maintained at full personnel. Minor adjustments in certain activities have been made so as to maintain so far as possible the more fundamental services of the department.

In the face of these circumstances, the report properly raises the question of what the future may hold. If the city is deprived of existing facilities for searching out the early case of tuberculosis, the follow-up work of the public health nurse, adequate beds for hospitalization of the advanced case with positive sputum, which is a source of danger to child contacts, beds for the early case which can be arrested and reclaimed, there would inevitably follow an increase in the tuberculosis rate. Other examples are cited. Foremost in the services of the health department is considered the public health nursing personnel which has become the unit through which the health educational program is disseminated. The various health and social agencies are working closely together and the private physicians are participating actively in the preventive program.

Among the important activities of the year are described administrative and epidemiology studies of scarlet fever, a survey of over 200,000 children below 15 years of age as to the degree of diphtheria protection, health education procedures, the introduction of a new strain for tubercle bacilli, the preparation and distribution of convalescent serum, the introduction of

milk on the city market fortified with vitamin D, and special measures for the education of food handlers. The last two pages of the report are devoted to a classified tabulation of health appropriations and to the number and distribution of personnel according to functions.

New Mexico—*The New Mexico Health Officer*, a quarterly bulletin of the Public Health Bureau, presents on its front cover a map of the state, with county divisions. Red dots on a yellow background effectively portray the location of 248 smallpox cases reported during the past 3 years.

According to a study reported the states which require vaccination before a child may enter school, had an average case rate per 100,000 of 9.5 for the years 1921–1926. The group of states in which laws make required vaccination impossible, had an average case rate of 102. In New Mexico, where vaccination is required, the average case rate in 1930–1932 was 20.9, but the 8 Texas borderline counties and one other had a case rate of 47.4. The remaining counties had a rate of 8.5.

The annual bureau of public health report for 1931–1932 omits detailed statistical tables, but effectively uses summary tables with interesting descriptive text. In recognition of the importance of treating syphilis cases, a portion of the financial aid received by the state from the Reconstruction Finance Corporation has been set aside for the purpose of buying drugs for treatment of indigent syphilis cases. Some doctors will give their services free for the work. The New Mexico Social Hygiene Association was formed during the year.

This annual report deserves credit for an interesting discussion of popular health education. Although no allowance was made for the work by the

Legislature, efforts to extend this service were made by the bureau "believing that it is a fundamental service to the people of the state." A newspaper service, with weekly articles, was inaugurated. Through the coöperation of the modern language department of the State University, these articles were also translated into Spanish for newspapers published in that language. Weekly talks were given over the radio. An effective monthly mimeographed bulletin was published as a medium of exchange for the ideas and experience of county health workers. Classes in public health were continued in university summer sessions. Public addresses were frequently given before men's and women's clubs, and a large quantity of health literature was distributed.

Illinois—The general health of the people of Illinois for the past 3 years has been distinctly superior to that which prevailed during any corresponding period in the history of the state, according to the report of the State Department of Public Health for the period July 1, 1930–June 30, 1932. The general mortality rate from all causes for the 3 years ended with 1931 was the lowest on record in Illinois for such a period. The decline in the infant death rate since 1928 has preserved over 4,000 infant lives which would have been lost had the most favorable conditions of any previous period prevailed. Declines in the tuberculosis, diphtheria, typhoid fever, and diarrheal diseases have been significant. Fully  $\frac{1}{2}$  million children were immunized against diphtheria compared with 300,000 during the previous 4 years. A survey covering 1 per cent of the population of the state was made to determine the completeness of reports of communicable disease.

The educational work of the depart-

ment has been maintained on a high level. Through numerous public addresses, periodicals, special bulletins, radio, and newspapers, the public has been informed of matters of current health interest, warned against potential or approaching danger, and advised concerning preventive possibilities and timely precautions. Education exhibits have been developed. As a practical demonstration in sanitation, the Department of Health, with the coöperation of the Department of Agriculture and the State Fair management, undertook to make the Illinois State Fair a model project of the kind in respect to sanitary and hygiene matters. This involved the elimination of all insanitary conditions and practices and the medical examination of all food handlers. One typhoid fever carrier, engaged as a dish washer, was detected and removed from that occupation, thus eliminating a potential source of much illness.

Steubenville, Ohio—During 1932 there was an attendance of 499 infants at baby conferences, or double the number of the previous year. In coöperation with the local medical society, the Kiwanis Club, and school health service, the health department gave immunization treatments to 327 first grade children (45 per cent) against diphtheria. Public health nursing services numbered over 10,000. In this city of 35,422, an infant mortality rate of 64 is noted.

The 17th anniversary of National Negro Health Week was observed in April by all local colored organizations. The Booker T. Washington health unit was formed for the strict annual observance of this health week. General meetings in the recreation center and in local churches were held, health literature was distributed, and health talks given. The annual report, although mimeographed, is effectively illustrated.

# LABORATORY

## WHOOPING COUGH PLATES IN A PUBLIC HEALTH LABORATORY\*

EDMUND K. KLINE, DR.P.H., F.A.P.H.A.

*Director of Laboratories, Cattaraugus County Department of Health, Olean, N. Y.*

IN an article published in 1916 Chievitz and Meyer<sup>1</sup> of the Danish Sero-therapeutic Institute described a method of obtaining cultures of *Hemophilus pertussis* from whooping cough patients through "seeding by projection of droplets" crediting the method to the suggestion of their "young colleague M. Emile Mauritzen." This method, commonly called the cough plate method, consists of holding a plate of suitable medium about 5 or 6 inches in front of the mouth of a coughing patient during a paroxysm to catch the material expelled from the deeper parts of the respiratory tract. In case the patient is not having actual paroxysms a series of deep coughs is induced. This method has proved of great value for the diagnosis and study of whooping cough in the hands of Danish workers over a period of several years. It was first used extensively in this country by Lawson and Mueller<sup>2</sup> of the Commission for the Study of Whooping Cough at the Boston Floating Hospital in 1925-1926 with favorable results, and more recently has been highly recommended by several authors, especially Sauer and Hambrecht<sup>3</sup> in this country, Gardner and Leslie<sup>4</sup> in England and Debre<sup>5</sup> and his coworkers in France.

Since studies of the epidemiology of

whooping cough in large centers of population are necessarily confused by the many ramifications of the contacts of individuals, a series of studies of whooping cough outbreaks in strictly rural areas was projected a few years ago by members of the staff of the Cattaraugus County Health Department in coöperation with the Division of Research of the Milbank Memorial Fund. Studies of one such outbreak in the spring of 1931 have been reported upon by Burroughs.<sup>6</sup> Reports of further studies during the fall and winter of 1931-1932 are now in preparation. Cough plate examinations were begun toward the end of the first outbreak and continued throughout the studies. The general plan of procedure in these studies was for a field investigator to make contact with all families in the area selected for study, to gather complete data on all respiratory disturbances appearing among the entire population of the district, and to obtain a complete history of all contacts between the various individuals in this population. For this purpose the investigator made semi-weekly visits to each household and school. On these visits cough plates were obtained from all susceptible children in the schools and also from a selected group of other children and adults comprising about one-third of the residents in the area and chosen to represent a cross-section of the population. As soon as a case of whooping cough was recognized, all the immediate contacts of this case were

\* Presented at the mid-year meeting of the New York State Association of Public Health Laboratories. Albany, N. Y., November 4, 1932.

added to the list of persons from whom semi-weekly cough plates were collected.

The plates used in this study were prepared in the laboratory using essentially the original Bordet-Gengou formula<sup>7</sup> with human blood. Due to economic conditions we were able to obtain human blood for a reasonable sum, paying \$5 for each single bleeding which yielded from 500 to 800 c.c. of blood. Defibrinated rather than citrated blood was used. All plates were inoculated less than 1 week after being prepared. After inoculation in the field they were sealed with a rubber band and brought into the laboratory the same evening. They were then incubated and examined each day for 5 days. If *H. pertussis* was present small mercury droplet colonies appeared in from 2 to 5 days. The appearance of these colonies was quite characteristic and the speed at which they developed after they first could be seen was remarkable. It was nothing unusual to examine a plate with a hand lens on one day, fail to find any evidence of growth, and yet on the next day find the plate studded with colonies from 1 to 2 mm. in diameter. We encountered some trouble from spreaders but little from the ordinary saprophytes of the respiratory tract which usually grew readily in the first day and thereafter enlarged very slowly. It was our practice to cut out, as soon as they were discovered, any colonies which looked as though they might spread, but frequently we would find a plate completely covered with a spreader.

The chief bacteriological difficulty in confirming the presence of *H. pertussis* lies in the fact that colony and individual morphology may easily be confused with that of the closely related Pfeiffer bacillus, *H. influenzae*. For this differentiation we made use primarily of the established difference of the two organisms in their growth characteristics on chocolate agar and

blood agar. Transplants of all suspicious colonies were made to tubes of Bordet-Gengou agar and of chocolate agar.<sup>8</sup> The bacillus of influenza grows readily on chocolate agar within 24 to 48 hours while freshly isolated pertussis organisms fail to grow in 4 days, or the growth is so scanty as to be scarcely visible. On Bordet-Gengou agar the influenza bacillus grows as a flat colony with irregular outlines while pertussis has the characteristic mercury droplet appearance. If the suspected colonies seemed to be *H. pertussis* by these differential media, smears were made from the agar slants, stained and examined to determine if the morphology of individual organisms corresponded with that of *H. pertussis*. In our studies all plates that showed colonies that answered these differential tests were called positive.

A total of 1,996 plates were examined of which 14 per cent were unsatisfactory. Of 343 plates taken from clinical cases in all stages of the disease 22, or 6.4 per cent, were positive. Five additional positive plates were obtained from individuals classed as carriers so that our entire series showed 1.4 per cent positives.

The number of colonies of *H. pertussis* on our positive plates varied from 1 to 100. There was little correlation between the stage of the disease and the number of colonies—single as well as large numbers of colonies (over 50) being obtained from all stages of the disease. We must remember, however, that the inoculation of these plates is a variable technic and that probably the number of colonies more nearly represents the success of obtaining material from the deeper parts of the respiratory tract than it does the actual number of organisms expelled.

Table I lists the plates taken from cases of clinical whooping cough in relation to the stage of the disease. We found one instance in which we ob-



TABLE I

COUGH PLATES FROM PERSONS CLASSED AS CLINICAL CASES OF WHOOPING COUGH

<i>Time of taking plates</i>		<i>Plates examined</i>	<i>Plates positive</i>	<i>Plates negative</i>	<i>Plates unsatisfactory</i>	<i>Percentage positive</i>
More than one week preceding onset		36	0	27	9	0.0
Days of week preceding onset	Seven	1	0	1	0	12.5
	Six	2	0	2	0	
	Five	0	0	0	0	
	Four	3	0	3	0	
	Three	1	0	1	0	
	Two	1	1	0	0	
	One	0	0	0	0	
Days of week following onset	One (date of onset)	3	1	1	1	43.7
	Two	3	2	1	0	
	Three	2	1	0	1	
	Four	4	2	2	0	
	Five	3	1	2	0	
	Six	0	0	0	0	
	Seven	1	0	1	0	
Weeks after onset	Second	23	9	10	4	39.1
	Third	23	4	17	2	17.4
	Fourth	28	1	26	1	3.5
	Fifth	27	0	26	1	0.0
	Sixth	24	0	22	2	0.0
	Seventh	24	0	19	5	0.0
	Eighth	22	0	19	3	0.0
	Ninth	19	0	17	2	0.0
	Thereafter	92	0	79	13	0.0
Total		343	22	276	45	6.4

tained a positive plate in the week preceding the first catarrhal symptoms of the disease. The highest percentage of positive plates was found in the week beginning with the day of onset. A gradually decreasing percentage occurred during the next 3 weeks. No positive plates were obtained after the 4th week of the disease.

Table II shows the positive plates in relation to the number of individuals furnishing them. We found that semi-weekly plates taken through the first 3 weeks of the disease were sufficient to give positive results in 93 per cent of our cases. It is obvious that if plates were taken 4 times a week or daily our chances of raising this figure to 100 per cent would be increased.

These findings are in general agreement with those of other investigators.

Chievitz and Meyer<sup>1</sup> in a series of 32 cases obtained 84 per cent positives in the week of onset and 71 per cent in the next 2 weeks, with no positives after that period. Sauer and Hambrecht<sup>2</sup> in a series of 200 cases obtained 98 per cent positives in the week of onset, 65 per cent from the 2nd to the 5th week and no positives thereafter. McGee<sup>3</sup> in a series of 35 cases obtained 56 per cent positives in the week of onset, 63 per cent in the 2nd week, 71 per cent in the 3rd week and 17 per cent in the 5th week. Marie<sup>10</sup> in a series of 48 cases obtained 88 per cent positives in the week of onset, 55 per cent in the 2nd week, 50 per cent in the 3rd week and none thereafter. Gardner and Leslie<sup>4</sup> in a series of 47 cases obtained 75 per cent positives in the week of onset, 67 per cent in the 2nd week, 75 per cent in

TABLE II

## CLINICAL CASES FURNISHING PLATES

	<i>Total cases</i>	<i>Cases with positive plates</i>	<i>Percentage positive</i>
More than one week preceding onset	5	0	
A. Week preceding onset	5	1	20.0
B. Week of onset	10	6	60.0
C. Second week after onset	12	7	58.0
D. Third week after onset	13	4	30.7
E. Fourth week after onset	14	1	7.2
A and B	10	7	70.0
A, B and C	14	13	93.0
A, B, C and D	14	13	93.0
A, B, C, D and E	15	13	87.0

No positive plates were obtained after the 4th week following onset.

the 3rd week and 25 per cent in the 4th week.

All of the cases from which we obtained positive plates would have been diagnosed as whooping cough by clinical manifestations alone. However, in certain cases positive diagnoses could be made by cough plates before clinical symptoms were decisive. Although it requires a minimum period of 7 to 10 days to render a laboratory report on a cough plate, we find that the time elapsing between the first prodromal symptoms and the date on which a positive diagnosis could be made by clinical symptoms alone averaged about 14 days for our series of 16 cases. Actually there were 5 cases in this series on which the laboratory reported a positive plate before the final diagnosis could be made.

We also found positive cough plates from 4 persons who did not develop any symptoms characteristic of whooping cough and who were classed as carriers. These findings have recently been reported in detail by Burroughs and Kline to the American Public Health Association in Washington. The epidemiological evidence of our studies convinced us that these carriers were not responsible for any additional infection and that they are probably of

little consequence in the spread of the disease. Post-convalescent carriers were not found.

The possibility of detecting missed or atypical cases by means of cough plates has frequently been asserted in the literature. There were only 2 additional cases in the area studied which could be classified as probable sub-clinical whooping cough, and the laboratory did not obtain plates from either of these individuals before the 2nd week following onset. All plates from them were negative. As in the case of carriers there was no epidemiological evidence that these sub-clinical cases were in any way responsible for transmitting infection.

On the other hand, there were many persons in the area studied who during the course of our investigations developed some respiratory symptoms, usually suggestive of common colds. We have epidemiological histories of 130 residents of the community not included in the above groups of whooping cough cases or carriers. Although 71 per cent of them showed some respiratory disturbances no positive cough plates were obtained from any of these persons. Many negative cough plates were obtained from them, including 434 plates from 46 persons dur-

also tends to minimize the importance of the rôle played by sub-clinical cases in whooping cough outbreaks.

## DISCUSSION

In considering our experience in connection with the question as to what place the cough plate procedure should be given in the program of a public health laboratory we are at once struck with the uncertainty of the method. Repeated negative cultures have been obtained from patients in the early stages of the disease. On the other hand, the identification of 93 per cent of our cases by the cough plate method has been quite satisfactory. It would seem that the first requirement for diagnosis should be that repeated plates be submitted at frequent intervals early

## GENERAL POPULATION COUGH PLATES

<i>Persons with Respiratory Symptoms</i>	<i>Week preceding cold</i>	<i>During cold</i>	<i>Week after cold</i>	<i>Totals</i>
Colds of less than one week duration without cough	10	8	10	28
with cough	2	4	3	9
Colds of one to four weeks' duration without cough	16	47	15	78
with cough	25	79	20	124
Colds of more than four weeks' duration without cough	4	28	1	33
with cough	14	138	10	162
Total number of plates taken during or near colds	71	304	59	434
Number of plates on above persons at other times				311
<i>Persons Who Showed No Respiratory Symptoms</i>				
Number of plates from persons showing no symptoms				75
Total number of plates from the general population				820

in the disease. We would recommend daily plates. In the next place it is also apparent that errors in the technic of inoculating plates will greatly modify the result. Therefore, it might be well to make the additional requirement that all plates be inoculated in the presence of some person with special knowledge of this procedure. With these two safeguards, the cough plate method may well be included in the program of a

public health laboratory as a means of the diagnosis of whooping cough.

We have shown that the method may serve to detect carriers and it seems quite likely that sub-clinical cases would also have been detected had sufficient plates been submitted at the proper stages of the infection. However, the practical value of detecting either carriers or sub-clinical cases is not established since epidemiological evidence indicates that neither of them are of significance in the spread of the disease.

We know of no application of laboratory findings that would aid in controlling the course of the disease in individuals.

As a means of release from quarantine the findings by cough plate methods seem to be of very little value. Comparison of results with the findings of various investigators using the sputum method of isolating *H. pertussis* show that the latter method is much superior toward the end of the disease, although not so satisfactory in the early stages. Neither method approaches the degree of accuracy necessary in quarantine release technic where dependence must be placed on negative findings.

The most important value of the more general use of cough plates is the research value. There are many disputed questions concerning whooping cough and a large series of cough plates from many laboratories would do much to answer them. For instance, we might be able to rationalize our present quarantine requirements. There are also many important bacteriological questions to be settled. Weill<sup>11</sup> and Debre<sup>12</sup> indicate that the organisms lose their virulence during the course of the disease. The serology of the group is not completely worked out and but little study has been made of dissociation variants.<sup>13</sup> The accessory food factor requirements of other

species of *Hemophilus* have been the subject of some recent investigations, which should be broadened to include the entire group.

Considering all of the above factors it would seem to us that at the present time cough plates are of greater importance to the research than to the routine public health laboratory.

#### CONCLUSIONS

In times of epidemics of whooping cough the routine public health laboratory can be of considerable service to the physician and to the community in occasionally making a bacteriological diagnosis of whooping cough before a clinical diagnosis can be made. As a means of controlling the spread of the disease, however, this will be of relatively little value since even the earliest cough plate diagnosis will be made after the individual will have passed his period of greatest infectivity. There is at present no evidence that cough plates have any special public health significance in other directions than early diagnosis.

#### REFERENCES

1. Chievitz, I. and Meyer, Adolph H. Recherches sur la coqueluche, *Ann. de l'Inst. Pasteur*, 30:503-524 (Oct.), 1916.
2. Lawson, George M. and Mueller, Mary. Bacteriology of whooping cough. *J. A. M. A.*, 89:275-279 (July 23), 1927.
3. Sauer, Louis W. and Hambrecht, Leonora. Whooping Cough: Early diagnosis by the cough plate method. *J. A. M. A.*, 95:263-264 (July 26), 1930.
4. Gardner, A. D. and Leslie, P. H. Early diagnosis of whooping-cough by cough-droplet method, with note on vaccines and their use. *Lancet*, 1:9-12 (Jan. 2), 1932.
5. Debre, R., Marie, Julien and Pretet, Henri. Le diagnostic bacteriologique de la coqueluche et la vaccinotherapie anticquelucheuse. *Gaz. med. de France*, 2:40-43 (Jan. 15), 1930.
6. Burroughs, Travis P. An epidemiological study of a rural outbreak of whooping cough. *Quart. Bull. Milbank Memorial Fund*, 10:41-52 (Jan.), 1932.
7. Bordet, J. and Gengou, O. Le microbe de la coqueluche. *Ann. de l'Inst. Pasteur*, 20:731-741 (Sept.), 1906.
8. Wadsworth, A. B. *Standard Methods of the Division of Laboratories and Research of the New York State Department of Health*. Williams & Wilkins, 1927, p. 96-103.
9. McGee, W. A. Pertussis. *J. A. M. A.*, 97:922-926 (Sept. 26), 1931.

10. Marie, Julien. Recherches bacteriologiques et immunologiques sur la coqueluche, Paris, thesis for doctorate. 1928.

11. Weill, E. Etiologie et prophylaxie de la coqueluche. *Medicine*, 2:841-842 (Aug.), 1921.

12. Debre, R., Marie, Julien and Pretet, Henri.

Le diagnostic bacteriologique de la coqueluche sa facilite et son interet. *Presse med.*, 37:18-20 (Jan. 5), 1929.

13. Leslie, P. H. and Gardner, A. D. Phases of Hemophilus pertussis. *J. Hyg.*, 31:423-434 (July), 1931.

## STANDARDIZATION OF THE COMPLEMENT-FIXATION TEST FOR SYPHILIS\*

RUTH GILBERT, M.D., F.A.P.H.A. (*Life Member*)

*Division of Laboratories and Research, New York State Department of Health, Albany, N. Y.*

PERSONAL preference for particular details in the complement-fixation test for syphilis renders improbable the general adoption, at this time, of any one technic *in toto*. If agreement on basic principles can be secured, however, a nucleus for a standard method will be provided. Coöperative studies made prior to 1930 indicated that, even with manifold variations in details, the complement-fixation tests for syphilis extensively used in Canada and the United States had much in common; also, that the least satisfactory of them, although generally lacking in sensitivity, seldom gave definite reactions with specimens from persons believed to be free from syphilis. Consequently, the conclusion seems warranted that, if precautions are observed to prevent technical and clerical errors, the chief concern in standardization will be the incorporation of factors found essential for obtaining significant results with weakly reacting sera.

Experience has shown that the outline for a standard procedure proposed

in 1924, when the problem of standardization was first undertaken, meets such a requirement in most particulars. In 1930, this outline was modified to incorporate features of technic believed to be desirable for insuring further the delicacy of the test, and was then submitted to representative serologists, the majority of whom signified hearty accord with the general plan for a standard procedure. The Committee on Standard Methods of the Laboratory Section of the American Public Health Association, at the meeting held in Washington, October 24, 1932, approved the technic recommended as a standard method, and referred the report to the section for final action next year.

Provided the test is performed by a capable personnel and is suitably controlled, and precautions to avoid technical inaccuracies are observed, the outstanding features of the procedure offered as a standard may be summarized as follows: the distribution of standard reagents by central laboratories; the employment of a cholesterolized antigen having a high degree of selectivity with serum from cases of syphilis; the performance of an independent complement-fixation test with a second antigen or of another generally accepted serological test for syphilis (precipitation or flocculation), for

\* Abstract of the report of the Referee on the Standardization of the Complement-Fixation Test for Syphilis presented to the Committee on Standard Methods of the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932. The complete report will be published in the American Journal of Syphilis.

purposes of control; the use of amboceptor that is markedly hemolytic and practically free from agglutinative properties in the dilutions used; complement that has been proved by preliminary tests to be actively hemolytic and to be readily fixed in the presence of antigen and syphilitic serum and which fails to react appreciably with antigen alone; a comparatively large

amount of patient's serum as well as a smaller quantity to detect so-called prezone reactions; and an extended preliminary period for fixation at a low temperature with an additional exposure for a few minutes at 37° C., or provision for a second test with fixation at 37° C. for from ½ to 1 hour, in case the history indicates the possibility of recent infection.

## VITAL STATISTICS

The Census of 1930 and the Growth of Population in Finland During the Last Decade—Some preliminary data concerning the results of the general census of 1930 in Finland are now available. The total registered population of Finland amounted to 3,667,067 persons on December 31, 1930. During the last half century, the population has increased from 2,060,782 in 1880, to the 1930 figure of 3,667,067. The decennial increases during this period have varied considerably. Between 1880 and 1890, the total increase was 319,358, or 15.5 per cent; between 1890 and 1900, 332,422 or 14.0; from 1900 to 1910, the increase amounted to 402,635 persons, or 14.8 per cent; between 1911 and 1920, to 249,610, or 8.0 per cent; and between 1920 and 1930, the increase was 302,260, or 8.2 per cent.

During the decade 1921–1930 the increase in population was slightly higher than during the preceding period of 10 years. In comparison with 1901–1910, however, the increase in population has fallen off very much. When it is considered that the civil war and severe epidemics occurred during 1911–1920, which greatly retarded the growth of the population, the increase in population of the latest period appears very small, for during the years 1921–1930

the conditions were in every respect normal. The mortality was very favorable. The poor growth of population was consequently due entirely to the great falling off in births.

Although the growth of population in Finland during the last 10 years proceeded more slowly than during earlier normal periods it is nevertheless quite large in comparison with conditions in the other countries of Western and Northern Europe. During 1921–1930, the growth of the population for Hungary amounted to 9.0 per cent; for Denmark 8.7 per cent; Belgium 8.2 per cent; France 6.9 per cent; Norway 6.2 per cent; England and Wales 5.3 per cent; Switzerland 5.0 per cent; and Sweden 4.0 per cent.

These figures of population growth are the results of greatly varied conditions of population. Together with Hungary, Finland has the highest rate of natality of these countries, but the surplus of population, for instance in Denmark, is approximately as large in spite of the lower birth rate in this country, because the conditions of mortality in Denmark are more favorable than in Hungary and Finland. In France, immigration from other countries has also contributed toward the increase in population.

Of the total population in Finland in

1930, 1,809,069 were males and 1,857,998 females. The excess of females was 48,929 and there were 1,027 females per 1,000 males. The disproportion between the number of men and women in countries which engaged in the Great War, does not apply to Finland, despite the fact that the latter incurred considerable losses to its male population during the civil war. These losses are not comparable to those suffered by the Great War contestants. As compared with Finland's ratio of 1,027 females per 1,000 males, England showed 1,096, Germany 1,066, and France 1,103 females per 1,000 males.

The rural population still predominates in Finland, although the population of towns regularly grows at a more rapid pace than the population in the country. In 1930 altogether 671,845 persons, or 18.3 per cent, dwelt in the towns and 2,995,222, or 81.7 per cent, in the country. During 1921-1930 the urban population grew by 128,799 persons, or almost one-fourth, and the rural population by 173,461 persons, or only one-sixteenth. The population of the so-called urban districts (boroughs or country-towns) is included in the rural population, though it is really more closely allied to the towns than to the country. Besides there are a number of densely populated districts especially in industrial centers and suburban areas in the vicinity of towns that have townlike settlements. If these are classified in the same category as the towns, the proportion of the population living in towns in 1930 would be 22.1 per cent instead of 18.3 per cent, and the proportion living in actual rural areas 77.9 per cent instead of 81.7 per cent.

The increase in the urban population has in the course of time become more and more dependent on immigration from the countryside. Although the urban population increased almost

fourfold during the 50-year period 1880-1930 the excess of births over deaths, after rising up to 1910, fell off again in absolute figures. During the 10 years 1921-1930 it was about as small as for 1881-1890. Calculated per 1,000 of the average population of the towns, this represents an enormous reduction; from 7.9 per 1,000 in the 1880's to 2.8 per 1,000 for 1921-1930. At the same time the excess of births over deaths in the rural districts dropped from 14.5 to 9.2 per 1,000, also a considerable falling off. The proportion per 1,000 in the rural districts was, nevertheless, during the last decade still more than three times the corresponding figure for the towns.

This reduction in the excess of births was chiefly due to the fall in the birth rate, which was especially marked in the towns. During 1881-1890 the birth rate in the towns averaged 29.2 per 1,000 of the population, whereas in 1921-1930 it was only half that figure of 15.0 per 1,000. With regard to the rural population the corresponding development was as follows: the birth rate was 35.6 per 1,000 in 1881-1890 and 23.6 for the last decade. The reduction is consequently approximately one-third in this case.

During this half-century the death rate also fell off, although to a far smaller extent than the birth rate.

While the difference in the figures of births in the towns during 1881-1890 and 1921-1930 was 14.2 per 1,000, the corresponding difference in deaths was 9.1 per 1,000. In the rural districts the development in this respect proceeded rather more slowly. The difference between the figures for births for these two decades was 12.0 per 1,000, while the figures for deaths recorded a difference of 6.7 per 1,000.—G. Modeen, M.A. Census of 1930 and the Growth of Population in Finland During the Last Decade. Bank of Finland. *Month. Bull.* 11:22-25 (Nov.), 1932.

**Statistics on Tuberculosis**—The 1930 report of the director of the Amsterdam association for the combating of tuberculosis indicates that the regular decline of mortality from tuberculosis in Amsterdam and in the Netherlands as a whole has been continued. The mortality rate of tuberculosis in Amsterdam is lower for men than for women. There have been no changes in the organization of the consultation centers of the district. A characteristic feature of this organization is the coöperation between the association, the physicians, the public health service, and the ministry of labor. As for methods employed, the attempt to search out all patients having open pulmonary tuberculosis has come to the fore. The number of children treated with BCG vaccine increased in 1930, and no harmful effects were observed. The general impression with regard to its value is favorable. The results of the Pirquet reaction on 22,694 children, aged 0-14, for the years 1920-1930 and the year 1930, show that the percentage of positive reactions is diminishing every year.

With reference to urban and rural tuberculosis, Dr. Josephus Jitta has published some interesting figures. The mortality rate in 1930 was only 7.31 per 10,000 inhabitants. During the period 1921-1930, the decline in tuberculosis mortality was 50 per cent for the cities and 33 per cent for the rural districts. The mortality from tuberculosis has increased considerably in children under 1 year of age.—*J.A.M.A.* 100:985 (Mar. 25), 1933.

**Industrial States Decline Most in Births**—In so far as it has been possible to judge from the partial data available, the decline in the birth rate during the last 10 years has been practically countrywide. Unfortunately, data for only 26 of the 48 states, and for the District of Columbia, are ob-

tainable for both 1931 (the latest year for which the facts have been published) and for 1921; but, without exception, the birth rate has dropped in these 27 areas.

There has been, however, a wide divergence in the rate of decline. The 3 Pacific Coast states, Oregon, with a birth rate of 13.6, California 13.9, and Washington 13.9 had the lowest birth rates in 1931; and Oregon and Washington at the same time rank among the 10 which show the greatest declines in the 10-year period. California just escapes inclusion in this group.

It is most interesting and significant that the greatest declines in the birth rate have occurred in the states of the northeastern section of the country where the population is highly industrialized. Connecticut's birth rate of 15.7 in 1931 shows the very largest drop—one of 34.9 per cent; this being closely followed by the decline of 34.5 per cent in New Jersey which shows a birth rate of 15.6 in 1931. These 2 states stand out in rather bold relief from all the rest; for there is a sizable gap between them and still another industrial state—Massachusetts, with a birth rate of 16.1 in 1931, showing the third largest decrease (one of 31.8 per cent). Rhode Island, with a birth rate of 16.3, had the fifth largest decline; Pennsylvania, with a birth rate of 18.4, had the ninth; and the drop in New York State, with a birth rate of 16.1, was well above the average for these 27 states. Even North Carolina, recording a natality rate of 23.0 and suffering the fourth largest decline, showed a considerable increase in the industrial population during the 10-year period. It seems hardly possible, however, that this alone is sufficient to account for so large a decline as the one of 31.1 per cent observed in North Carolina's birth rate.

In the few Southern and "Border" states included among those for which



there are data for 1921 and 1931, the situation is widely divergent. North Carolina suffered a large decline; so did Virginia with a drop of 29.5 per cent and Maryland with one of 30.0 per cent. In Mississippi on the other hand, the drop was only 11.9 per cent and in the District of Columbia, which is really a city rather than a state, the smallest decline of all (5.9 per cent) was registered.

Among states with largely agricultural populations, Oregon, Washington, New Hampshire, and Virginia were those to suffer above-average drops in the birth rate. Main and Mississippi, on the other hand, suffered the smallest declines; and Wisconsin, Minnesota, Vermont, Nebraska, and Kentucky recorded below-average decreases.

Pronounced differences appear in certain states which adjoin one another and which call for special study. For example, the drop in New Hampshire has been more than twice that in Maine and 50 per cent more than in Vermont. All 3 are states with large rural populations and negligible negro populations. The drop in South Carolina is much less than that in North Carolina, and the decline in Kentucky about one-fourth less than that in Virginia.

New Mexico and Nevada, the states which recorded the highest and the lowest birth rates in the country in 1931, were admitted to the U. S. Birth Registration Area since 1921; and it is thus impossible to determine the extent to which their natality rates have dropped during this 10-year period. New Mexico's 1931 birth rate was 28.4 per 1,000 population and Nevada's 13.2. Both were admitted in 1929, and there was actually a slight increase in the birth rate in New Mexico during the short period of 3 years for which the facts are obtainable. This may well reflect the improvement in birth registration in recent years. In Nevada, the

drop has been small. In Arizona, admitted in 1926, there has been no general downward trend in the birth rate, although a sharp drop was recorded in the year 1931. Arizona, like New Mexico, has a large Mexican population; and it is extremely probable that the Mexicans constitute the one racial element of the population which is not sharing in the declining birth rate. In several of the states, admitted to the birth registration area since 1921, the birth rate showed either a slight upward trend, or no appreciable change until the year 1931. The most conspicuous examples of this are Arkansas (admitted in 1927), Georgia (1928), Idaho (1926), North Dakota (1924), Oklahoma (1928), and Tennessee (1927).

Georgia has the distinction of being the only state to show a higher birth rate in 1931 than in 1930. In Oklahoma (17.7) and Wyoming (19.8), the figures were identical for the 2 years.—Met. Life Ins. Co. *Stat. Bull.* 14:3-5 (Mar.), 1933.

Vital Statistics for Pennsylvania in 1932—The provisional total of live births registered in Pennsylvania in 1932 was 168,202. This number represents a birth rate of 17.1 per 1,000 population which is the lowest ever experienced in the Commonwealth. With the exception of 1929-1930 there has been an annual decrease since 1927 of approximately 10,000 in the number of live births recorded in this state.

Mortality as well as natality was unusually low in 1932. The preliminary general death rate of 10.9 per 1,000 population and the total of 107,595 deaths, exclusive of stillbirths, were lower than any other year's record. When final tabulations for the year are completed, this total and rate will be increased somewhat. And it is likely that the final mortality total for last year will be less than the record low of 1921 when only 109,919 deaths were

reported. Consequently, it is very reasonable to predict that the 1932 general death rate will establish a new minimum.

Compared with preceding years, infant mortality in 1932 was favorable. For the first time in Pennsylvania's history, deaths under 1 year of age numbered less than 10,000. While the totals of 9,919 infant deaths and the rate of 59 per 1,000 live births were provisional, they indicate a final infant mortality figure that is considerably less than average. The death rate from diseases of early infancy of 23.6 per 1,000 live births was somewhat higher than the corresponding rate in 1931 and lower than the 1930 figure.

In four diseases of childhood, namely, infantile paralysis, diphtheria, scarlet fever and whooping cough, the deaths showed increases over 1931. The mortality from poliomyelitis (infantile paralysis) in 1932 was greater than in any year since 1916 when 668 deaths occurred and a case fatality rate of 31 per 100 cases was registered. Last year there were 13 deaths from this disease per 100 reported cases. In spite of a substantial reduction in its morbidity, the diphtheria mortality increased in 1932. However, while this rate of 4.0 per 100,000 population was higher than that of 1931, it was lower

than the diphtheria mortality of any other year.

Judging from preliminary reports, the mortality from tuberculosis and pneumonia in 1932 was lower than in former years. The 1932 death rate from tuberculosis (all forms) was 52.5 per 100,000, as compared with 56.5 in 1931; for pneumonia the 1932 rate was 81.5 and the 1931 rate 97.2. On the other hand, the deaths and death rates from heart disease, cancer, cerebral hemorrhage and diabetes continued to rise, the mortality from these diseases in 1932 being reported as follows: heart disease 238.4; cancer 102.1; cerebral hemorrhage 85.7; and diabetes 25.7. Due to the widespread incidence of influenza in the latter part of the year, there was an increase in the death rate from this disease, from 28.1 in 1931 to 29.3 in 1932. A slight rise was noted in the suicide rate from 4.5 per 100,000 in 1931 to 4.6 in 1932; at the same time there was a slight decrease in the homicide rate from 4.0 in 1931 to 3.9 in 1932. Accident fatalities in general registered decreases from preceding annual reports. This is explained partly by more unemployment and less use of motor vehicles due to current economic conditions.—Pennsylvania Dept. of Health. *Vital Stat. Bull.* 8:6 (Mar.), 1933.

## PUBLIC HEALTH ENGINEERING

**Protecting Bathing Facilities by Use of an Ammo-Chlorine Boat—**The attempt to control the contamination of five bathing areas of the "impounded stream" type and four of the "artificial lake" type scattered over an area of about 200 square miles in the Forest Preserve District of Cook County, Ill., is described.

A portable type of chlorine boat mounted on a two-wheeled automobile trailer was designed. In addition to a chlorinator and ammoniator of the dry feed type, the boat was fitted with racks for carrying at least a thousand pounds of liquid chlorine or ammonia. As great accuracy was not considered essential a control apparatus of the pulsating meter type was used. The motive power was provided by a medium sized outboard motor which also assisted in diffusion of the chlorine.

As local conditions differed in each bathing area an effort was made to adapt the treatment to the particular location. The results are discussed from the standpoint of one location of the "impounded stream" type. The author concludes that it is possible at least temporarily to control the bacterial content of certain natural or semi-natural swimming locations. Chauncey A. Hyatt, *Munic. San.*, III, 9, 370-371. (Sept.), 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 7), 1933. Abstr. H. N. Old.

**Conformity of Public Water Supplies to the U. S. Treasury Department Standards—**The author briefly reviews the evolution of the present Treasury Department Standards for drinking water used on interstate carriers and the procedure followed in the certification of the same. In 1931,

1944 public water supplies in the United States were used as sources of drinking and culinary water by interstate carriers. Seventy-nine per cent of the supplies reported on were recommended for favorable certification, 18.5 per cent for provisional certification and 2.5 per cent prohibited for use. Practically all favorably certified supplies meet the bacteriological standards as did 78 per cent of those provisionally certified. Probably 75 per cent of all public water supplies would meet Treasury Standards as a whole and about 90 per cent would meet the bacteriological standards. R. E. Tarbett, *J. Am. W. W. Assn.*, 24, 9:1281-1287, 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 7), 1933. Abstr. H. K. Gidley.

**Colon-Aerogenes Types of Bacteria as Criteria of Fecal Pollution—**As the result of extensive work of their own and the examination of published articles and reports which they briefly review, the authors conclude: "(1) There is a growing sentiment that the Bact. aerogenes types of organisms in water, apart from Bact. coli, have little significance as criteria of fecal pollution; (2) the fecal significance of organisms designated as Bact. coli and Bact. aerogenes depends on the differential method used to distinguish them; (3) in ferrocyanide citrate agar, the Bact. coli type of colony is the only one strictly characteristic of feces; (4) the Bact. aerogenes type and the intermediate types as determined by this medium, are inconsequential in feces; (5) the distinctive types of colon-aerogenes organisms in ferrocyanide citrate agar retain their definite colony characteristics for at least six

months—as determined by subsequent plating of a large number of strains in the same medium; (6) it is the author's conclusion that the *Bact. coli* type of colony in this medium is alone definitely indicative of fecal pollution; that the *Bact. aerogenes* type and the intermediate types of colonies are of no special fecal significance, and that the latter types should, therefore, be excluded from consideration as evidence of dangerous fecal pollution. F. O. Tonney and R. E. Noble, *J. Am. W. W. Assn.*, 24, 9:1267–1280 (Sept.), 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 14), 1933. Abstr. H. K. Gidley.

**The Use of Bleaching Clay in Water Purification**—"Bleaching clay shows advantage in water treatment by reason of its low price and its great capacity to remove tastes, odors and color. These complex silicates are very inert to reactive chemicals, so that there are not the possibilities of unwanted chemical reactions as there is with superchlorination and with ammonia. Bleaching clay removes unpleasant characteristics from water by removing the substances causing them. Its use does not impart any chemical characteristics to the water that might be disagreeable. To remove unwanted material from water by a natural, untreated substance, as a clay, does not produce any unpleasant psychological reaction in the mind of the consumer. Bleaching clay has the capacity to remove traces of phenol from phenol contaminated water; shows considerable capacity to remove chlorine and sulphuric acid from water containing these chemicals: with aluminum sulphate forms a heavy floc which settles rapidly.

"Bleaching clay itself has bactericidal properties. With prechlorination, the great capacity of the clay to take up chlorine brings about more effective

sterilization and reduces putrefaction and bacterial proliferation in basins and filters to a minimum. The economies possible in lessening the amounts of lime and other chemicals needed reduce the cost of using bleaching clay. Seven to ten cents a million gallons, for a few pounds of bleaching clay used regularly, even when there are no serious color or odor problems, will be well spent as insurance against variability and possible trouble. The more unwanted substances are removed from the water supply, the less chance dissatisfaction will arise." Edw. M. Slocum, *Journal Pennsylvania Water Works Operators' Assn.*, IV, 53–64, 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 14), 1933. Abstr. Judson A. Harmon.

**Why a Seasonal Quarantine Is Placed Upon Mussels and Clams**—Since 1927, when an outbreak of mussel poisoning involving over 100 cases occurred in and around San Francisco, the California State Board of Health has established a quarantine on shellfish during that season of the year when the poison is at a maximum in the mussels and clams. The toxicity of the shellfish varies from season to season and from month to month, increasing during the summer months, and it may reach a maximum as early as June or as late as September. It has been found that  $\frac{1}{4}$  ounce of bicarbonate of soda added during cooking, for each quart of water used, destroys 85 per cent of the poison when the cooking process is continued for 20 to 30 minutes.

Occurrence of the poison in clams does not run strictly parallel to its occurrence in mussels. In both cases the poison is confined almost entirely to the intestines of the bivalve and since these organs are larger in clams they are generally discarded, hence clam poisoning is not as frequent as mussel poisoning. It is to be remembered that cooking alone, without the

use of bicarbonate of soda, does not reduce the danger of poisoning. By general use of the bicarbonate of soda and by laboratory tests on the strength of the poison, it may be possible in the future to reduce the time of quarantine to a minimum. H. Muller, *Weekly Bull. Calif. State Dept. of Pub. Health*, XI, 35:138-140 (Oct. 1), 1932. From *Pub. Health Eng. Abstr.*, Vol. XIII, Jan. 21, 1933. Abstr. Frank E. DeMartini.

**New Paris**—A very serious view is taken of the inadequate supply of potable water and means of sewage treatment for the rapidly growing population of Paris. At present about 3 mil. c.m. of water is provided, 1,815,000 c.m. of which is purified Seine and Marne water. It has been estimated that by 1960 a further 2 mil. c.m. will be required, which for navigation reasons cannot be withdrawn from the river. In 10 years the quantity of water used for condensation purposes in big electrical power stations will have risen to 120 c.m. per sec. from 12 c.m. per sec. A corresponding increase in the temperature of river water will give rise to fogs in the valley. Ninety-two mil. c.m. of sewage is discharged untreated into the Seine; consequently river water must be treated with high chlorine dosages. It is urged that increased treatment of sewage on land, and the construction of impounding reservoirs for potable water should be immediately undertaken if a crisis in 10 years' time is to be averted. F. Bordas and J. Riviere, *Rev. d'Hyg.*, 8, 38, 1930. From *Summary of Current Lit.*, Water Pollution Res., VI, 3:77 (Mar.), 1933.

**The Water Supply and Sanitation of Paris and District**—The writer, in a critique of "New Paris" by Bordas, F., and Riviere, J. (see previous Abst.) considers that the situation in the water

supply and sanitation of greater Paris is not as grave as they assume. He ascribes the defects of the water supply system to an out-of-date administrative organization. The water supply of Paris itself is sufficient and more for present day needs, but a 5 per cent increase per annum in the potable water demand is foreseen in the next 20 or 30 years. The suburbs generally have an insufficient water supply, e.g. in the Seine Department only 150 litres per head of potable water is provided, while in Paris there are 500 litres per head. A greater coöperation between Paris and its suburbs and the lessening of the number of separate water works is urged. New sources of potable water for greater Paris are under consideration and will probably be provided by ground water from the Loire valley. The program of the Ministry of Public Works to erect a system of dams in the upper Seine basin which will regulate the water level at the mouth of the river for navigation purposes, and have an accessory value in controlling flood levels, producing electrical energy, and providing a supplementary supply of water for Paris is described. In discussing the sewerage of Paris the writer describes briefly the program put forward in 1929 by the Conseil-general of the Seine which includes the construction of a chain of collecting sewers encircling Paris to the north and south and avoiding discharge of sewage into the Seine or Marne during their flow through the city. An artificial treatment plant capable of enlargement according to future needs is also to be erected to prevent pollution of the Seine, and the present irrigation fields are to be maintained. The difficulties involved by this scheme, including coöperation between the neighboring departments, are discussed. The author shows that the raising of the temperature of the river by the condensation waters from the power sta-

tions is not at present a serious problem; should it become so in the future the improved sanitation conditions will counteract its effect. H. Giraud, *Ann. d'Hyg.*, 9, 293, 1931. From *Summary of Current Lit.*, Water Poll. Res., VI, 3:77-78 (Mar.), 1933.

**Cotton Guard Rope in Swimming Pools as Source of Colon-Aerogenes Group**—Positive presumptive tests which gave typical aerogenes colonies on partial confirmation were given by water from a swimming pool after the introduction of a cotton guard rope which was immersed in the water. Examination of strands from the rope showed the presence of the colon-aerogenes group and it was found that bacterial growth was possible upon the moist rope. Guard ropes of organic material are unsuitable for use in swimming pools. H. W. Leahy, *J. Am. W. W. Assn.*, 24, 1062, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 3:87 (Mar.), 1933.

**A New Nutrient Medium for the Isolation of B. Coli**—A new medium for the detection and isolation of B.

coli utilizes the characteristic growth of B. coli on agar containing traces of copper. Two drops of 10 per cent copper sulphate solution are added to 10 c.c. alkaline liquid agar; the mixture is autoclaved at 110° C. for 20 mins. and then poured into petri dishes and left to set. Colonies of B. coli develop rapidly. Each has a fine rim and is raised at the center; a central yellowish brown zone is surrounded by a yellow and then a light yellow zone. All of these, especially the middle zone, show a copper lustre. The usual cultural and fermenting properties of the colonies are maintained. Selectivity is exhibited by the medium; typhoid, paratyphoid, Gartner, and dysentery, diphtheria bacilli, fecalis alkaligenes and lactis aerogenes bacteria and staphylococci do develop in it after 24 hours incubation at 37° C. Very rarely whitish, not transparent colonies of B. paratyphosus B. may appear. The imperfect development of the typhoid bacilli may be used as a criterion for their identification. G. Cascelli, *Zbl. für Bakt.*, I, Orig., 124, 537, 1932. *Summary of Current Lit.*, Water Poll. Res., VI, 3:94 (Mar.), 1933.

## INDUSTRIAL HYGIENE

**Lead Poisoning, New York State, 1931**—There is given a table of 85 cases of lead poisoning reported during 1931—27 cases among general painters, 24 among storage battery workers, 6 among color manufacturers, 5 among printers, and the balance scattered. A conspicuous reduction was noted in lead poisoning in the storage battery industry, largely due to the efforts of one large plant to control it.—Adelaide Ross Smith. *Indust. Bull.*, New York Dept. of Labor, 11, 10:315 (July), 1932. E. R. H.

**Silicosis—The Hazard, What It Is, and How It May Be Prevented**—This is a summary of the present-day problem of silicosis, particularly as related to New York State and should be read in the original by those further interested: Two or three important features stand out in the prevention, such as physical examinations and the control of silica dust in the breathing atmosphere.—J. D. Hackett, *Indust. Bull.*, New York Dept. of Labor, 11, 15:475-476 (Dec.), 1932. E. R. H.

**Silicosis in Great Britain**—The Secretary for Mines was asked by Mr. David Grenfell the number of cases of silicosis reported from each of the British coalfields, to which he replied that silicosis was not a notifiable disease and the only figures were those of cases paid compensation. The number of such cases between February 1, 1929, and December 31, 1931, was 91, including 20 fatal cases. The number of cases in 1931 in which compensation was paid was 52, of which 13 were fatal.

The Coal Mines Act requires the

prevention of dust from power drills when they are used for drilling in ganister, hard sandstone, or other highly siliceous rock.

The stone dusting of colliery roadways as a protection against coal dust explosions has been generally enforced for nearly 12 years and has proved remarkably effective. The Secretary knew of no evidence that the practice had been injurious to health. The evidence in the very few cases (of silicosis), which were not definitely associated with the use of power drills in siliceous rock, was not conclusive. The condition of the lungs known as Anthracosis was not specifically related to the use of power drills.—Parliamentary Debate, House of Commons, Nov. 15, 1932, *Indust. & Labour Inf.*, Dec. 12, 1932, p. 330. E. R. H.

**Occupational Disease, New York State, 1932**—Typed tables show the prevalence and nature of occupational diseases reported, divided into those "up-state" and those for New York City—the latter further subdivided into those which were allowed compensation and those which were disallowed.

The grand total for the year 1932 was 610, of which 458 appeared on the compensation schedule and 152 were unclassified. The largest single group was benzol, etc., with 107 cases, followed by dermatitis due to alkalis, 102 cases; lead poisoning, 79 cases; and dermatitis due to oils, 61 cases; while afflictions due to lacquers, solvents, carbon monoxide, petroleum products, and chrome were all fairly frequent.

A more extensive table compares the years 1930, 1931, and 1932, and arranges the causes in alphabetical order

—the occupational diseases reported being due to about 140 causes. The totals for the 3 years were 864, 568, and 615 respectively. The prominent causes, in addition to those mentioned above, were: Acids, anilin dyes, amido-derivatives of benzine, anthrax, arsenic, benzine, calcium hydroxide, cement, various forms of dermatitis, dyes, dusts, mercury, poison ivy, silica, soap and soap powders, sodium hydroxide and turpentine.—Division of Industrial Hygiene, New York State Dept. of Labor (received March, 1933).

E. R. H.

**The Position of the Medical Officer of Health in Relation to Industrial Hygiene**—After reviewing the historical fact that industrial hygiene in the British Isles has been administered from a central source—in more recent years by the Home Office—the author discusses the experiences in the city of Coventry following a voluntary liaison set-up between the Engineering Employers' Association and the Local Board of Health of which the author is Medical Officer. Thus the Local Board fills an advisory rôle in relation to factory welfare and occupational hygiene in a vicinity employing some 50,000 persons, and factory hygiene is not omitted from the local public health scheme.

In the discussion which followed, Dr. Clyde McKenzie (Smethwick) opposed the control of factory inspection by the local authority for several reasons: The loss of time in a factory was almost entirely dependent on the general health of the workers rather than on occupational risk (in which situation the local medical officer of health already had ample powers), and a small centralized staff was necessary to build up the special knowledge necessary to understand and control occupational diseases. Local interest was acceptable from the voluntary

standpoint, but any legislative control should be from a central office to insure uniform standards.—A. Massey, *J. Roy. San. Inst.*, 53, 9:494-499 (Mar.), 1933.

E. R. H.

**Frequency of Pneumonia Among Iron and Steel Workers**—This *Bulletin*, after describing the statement of the problem, takes up the factors apart from working conditions such as seasonal influences, economic status, age, race, alcoholism, and community pneumonia, followed by a study of the incidence of pneumonia in relation to the nature of iron and steel working conditions.

Previous studies of industrial sick benefit associations by the Public Health Service have consistently shown a higher rate of pneumonia among these employees than those in other industries as a whole. The present study, 1924-1928, showed 35 per cent increased incidence of pneumonia above the average for all reporting establishments in the steel industry. The highest rates were among employees of the blast furnace, coke plant, open hearth, general labor about the mills, and rod and iron mills. The departments showing a high pneumonia rate tended also to show abnormally higher rates of influenza and other diseases of respiration.

Factors apart from working conditions were of insufficient influence to account for the excesses described. The frequency of pneumonia among men exposed to inclement weather was 13.6 cases annually per 1,000. The rate among men subjected to heat hazards involving wide temperature changes was 12.6 per 1,000. That among 1,000 factory men exposed to no industrial condition was only 3.9 per 1,000. Strenuous work also appeared to intensify the hazard when performed under intermittent exposures to high temperatures. There appeared to be no way



of evaluating the effect of dust upon the incidence rate of pneumonia. Likewise, the influence of gases alone could not be measured, although the only gas found in sufficient concentration to produce physiological changes was sulphur dioxide. A common factor appeared to be, sudden cooling or chilling of the body.

Of those who died of pneumonia, nearly one-fifth succumbed before the end of the first week of illness, while among those who recovered, 50 per cent were disabled for 6 weeks or more. These tended to show a higher rate of heart effects than found in a control group in the same plant or among industrial workers in general. A number of recommendations complete the report.—Dean K. Brundage *et al.*, *Bull.* 202, U. S. P. H. S., Nov., 1932, 51 pp.  
E. R. H.

**Annual Report, Institute for Science of Labour, 1930-1931 (Japan)**—This report of 25 pages embodies the findings of a group of research workers and investigators devoting their time to various subjects in occupational hygiene and diseases.

The organization of the Institute is described and the first 10 years of its progress completed July, 1931. The report gives a list of the lectures and reports made by the members of the staff at various meetings and congresses as well as abstracts of the papers published by the staff for the fiscal year ending July 30, 1931. Most of these papers (34 in number) have appeared in the *Journal of the Science of Labour*, but a number of them are cited in the *Japanese Yearbook of Social Science* and some in the Commemoration Number of the 10th Anniversary of the Institute. It also has been decided to select and translate some of the papers into English and German, and a list of a dozen of these is advertised. The report also contains a diagram of the

ground plan of the Institute and a list of the staff of some 30 persons.—Gito Teruoka, Director, Institute for Science of Labour, Kurasiki, Japan (received October, 1932).  
E. R. H.

**Occupational Diseases in Czechoslovakia**—Cases of occupational diseases notified to the Accident Insurance Institutes at Prague and Brno between July 1, 1932, and November 30, 1932, were as follows: Prague, 595; Brno, 302. Most of these were cases of silicosis; cataract, lead poisoning and cancer come next on the list. The Czechoslovak Act relating to compensation for occupational diseases came into effect July 1, 1932.—*Indust. & Labour Inf.*, XLV, 11:322 (Mar. 13), 1933.  
E. R. H.

**Sickness Among Male Industrial Employees During the Final Quarter of 1932**—The influenza epidemic during the fourth quarter of 1932 caused a higher rate of sickness among employees in the selected industries studied, but if this cause is deducted the frequency of sickness is just about the same as in the corresponding quarters of 1930 and 1931.—Dean K. Brundage, *Pub. Health Rep.*, 48, 13:322 (Mar. 31), 1933.  
E. R. H.

**Pottery**—The report includes a descriptive introduction, the extent and scope of the pottery industry in the United States and the conditions found in three typical plants, after which the process of manufacture and the potential health hazards are given. These latter are discussed under the heads of dust, heat, lead poisoning, chemicals, dampness, other hazards, and "frequency and severity rates." In addition, there is a Classification and Index of Jobs with the chief hazards given for each.—Retail Credit Company (Atlanta, Ga.), *Industry Report*, 8, 4:33-42 (Apr.), 1933.  
E. R. H.

## FOOD AND NUTRITION

Vitamin D and the Conservation of Calcium in the Adult. *II. The Effect of Vitamin D on Calcium Conservation in Adult Rats Maintained on Low Calcium Diets*—In a previous paper (*J. Biol. Chem.* 97:265, 1932), results were reported on feeding a high calcium-low phosphorus rachitogenic ration with and without additional vitamin D.

In the present paper are reported results obtained on adult rats kept on a ration low in calcium and phosphorus with and without vitamin D supplements.

Three rations were used in these experiments, one consisting of yellow corn, wheat gluten and sodium chloride, and containing 0.058 per cent calcium and 0.28 per cent phosphorus.

The second was a duplication of the first ration except that vitamin D had been synthesized therein by exposure to ultra-violet radiations.

The third which served as a normal control ration, was composed of two-third stock Ration 14 (*Science*, 57, 449, 1923) and one-third whole milk powder. It contained 0.56 per cent calcium and 0.58 per cent phosphorus. Four groups of female rats were used. One group was killed at the beginning of the experiment and the other three received the rations.

The general appearance and behavior of the rats showed no significant variation from the normal until the 10th week, at which time they became so restless it was necessary to transfer them to individual cages. By the end of the 15th week the differences in the three groups were very pronounced. On the non-irradiated low calcium ration diet there was a hypertonic condition of the muscles and the animals

were emaciated and senile in appearance. The rats on the irradiated low calcium diet did not become so emaciated and there was no muscular tenseness.

The femurs suffered a 10 per cent reduction in ash. The introduction of small amounts of vitamin D into the calcium-deficient ration provided considerable protection from mineral losses in a parallel series of the rats. Only about 6.5 per cent of ash was lost from the femurs. Weight losses were greatly reduced. Calcium content of the blood serum was increased and the parathyroids were maintained almost normal in size.

*III. The Effect of Vitamin D on the Teeth of Rats*—These experiments were carried out in two series. For the lactation series the stock diet consisted of yellow corn, oil meal, crude casein, alfalfa, bone ash, sodium chloride, dried yeast, skim milk powder, and butter fat. Vitamin D was added in the form of irradiated dried yeast at a level of 0.5 per cent of the weight of the ration.

In the low calcium series the diet consisted of yellow corn, wheat gluten, and sodium chloride. Vitamin D was synthesized in the ration by treating it with ultra-violet radiations. A stock rat ration which was unable to maintain normal ash content of bone in female rats during lactation did not lead to depletion of minerals in the incisor teeth, and liberal additions of vitamin D correspondingly had no effect on the teeth.

However, a ration low in calcium when fed to adults over a long period of time was unable to maintain normal composition of teeth or bone even without the strain of reproduction. The sole addition of vitamin D resulted in

almost complete protection against mineral losses, as revealed by analysis for ash and histological examination. For complete protection the ration was probably too low in calcium.—Vera M. Templin and H. Steenbock, *J. Biol. Chem.* 100:209 (Mar.), 1933.

**Antimony Poisoning Due to the Use of Enamelled Vessels**—In recent years there have been several outbreaks in England of antimony poisoning due to the use of enamelled vessels of inferior quality for the preparation of acid drinks such as lemonade. The first of these outbreaks occurred in the summer of 1928. Lemonade was prepared in a number of new white enamelled buckets and allowed to stand over night. Next morning they were placed in various parts of a building for employees of a local firm.

By noon, 70 of 500 employees had been served, and practically all were speedily sick. Fifty-six of the patients had to be removed in an ambulance. The symptoms were a burning sensation in the stomach, colicky pains, nausea, vomiting, and collapse. In no case did the vomiting amount to hematemesis, and intestinal symptoms were absent. The period and degree of distress varied with the quantity of drink consumed, and in many of the younger girls signs of hysteria were present in addition to the symptoms of poisoning. In most cases the patients were able to return to work within three hours, only two being detained in the hospital over night.

The "lemonade" crystals which were used to make the lemonade were examined and found to contain 80 per cent of sugar, 18 per cent of tartaric acid and  $1\frac{1}{2}$  per cent of carbonate of soda. The enamel on the pails contained about 3 per cent of antimony oxide. The tartaric acid had dissolved the enamel and presumably formed tartar emetic with the antimony pres-

ent. A tumblerful of the liquid was found to contain  $1\frac{1}{2}$  grains calculated as tartar emetic, the emetic dose being  $\frac{1}{2}$  to 1 grain.

The second outbreak occurred in 1929 at a gathering at which 120 persons were present. The lemonade in this case was made from sliced fresh lemons, and was prepared in white enamelled iron jugs. Twenty-five to 30 persons were ill within half an hour after consuming the drink. The enamel of the jugs was found to contain 9 per cent of antimony oxide.

The third outbreak occurred in 1932 in a large London hospital. Sixty-five of 70 persons present were seized with acute symptoms of vomiting. In this case also the lemonade was prepared from fresh fruit in white enamelled iron jugs.

A warning is sounded against the use of low-grade enamels. These are made from a mixture relatively low in silica content and are fired at a low temperature. They are not acid-proof, and seem to be readily dissolved by citric, tartaric, acetic, and other acids present in foods. The buckets and cans responsible in the above cases were not intended for use with food or drinks, but were so used and there was nothing in their appearance to suggest that they were not suitable. The public should, therefore, be warned that enamelled hollow-ware vessels intended for other purposes may be dangerous if used for the preparation or storage of food or drink.—Ministry of Health, *Brit. Food J.*, 35:24 Mar.), 1933.

**Relation of Vitamin A to Cancer**—Kuh reports that the study of the effect of varying dosages of vitamin A from various sources on the growth of tumors of mice under controlled conditions showed that the tumor implants of mice were not affected by those amounts of vitamin A contained in the usual diet, supplemented by as much as

500 units of vitamin A. On the other hand, when maximal dosages (1,000 or more vitamin A units) of the provitamin carotene were administered, varying degrees of inhibition of tumor growth were observed.

The utilization of the carotene was limited by a number of factors, including apparent failure on the part of the animal to convert the carotene to vitamin A, this incompetence being due to the absence from its liver of the enzyme carotenase. The problem of inhibiting tumor growth by means of vitamin A becomes one of determining whether more efficient methods of administration can be devised. Two possible procedures are worthy of trial: (1) the feeding of carotene plus the injection of a source of enzyme carotenase, and (2) the feeding of new preparations of vitamin A concentrate.

The administration of the maximal dosages of vitamin A appeared to be without a harmful effect on the animals. This suggests that the inhibited growth of the tumor is the result of a specific action of the vitamin A on the cancer cell.—*Yale J. Biol. & Med.*, 5:123, Dec., 1932 (Abstr. *J.A.M.A.* 100:779, Mar. 11, 1933).

**The Antiscorbutic Value of Fresh Lime Juice**—A scurvy producing diet of caseinogen, calcium carbonate, sodium chloride, oats and bran was given *ad libitum*. This was supplemented with 5 c.c. cod liver oil daily per animal. Young guinea pigs usually weighing 300–400 g. were used. The juice was prepared fresh daily from ripe Egyptian limes not more than 2 days gathered and was given in daily doses of from 0.5 c.c. to 3.5 c.c. It was found that the minimum protective dose of fresh lime juice is 1.5 c.c. and partial protection is conferred even by the smallest dose given, 0.5 c.c.

Comparisons were made between the Egyptian and West Indian limes since

the latter had been employed in previous experiments reported. Ripe fruits were used but the juice was kept in a refrigerator throughout the experiment which was approximately 2 months. It was shown that in both juices the antiscorbutic principle is not stable for a long time. During the experimental period deterioration was such that 3 c.c. failed to protect against the diseases. There seems to be no doubt that loss of this factor takes place at a much greater rate from lime juice than from lemon juice. Previous investigators (*Biochem. J.* 15:83, 1921), obtained slightly better results with green than with ripe limes, thus indicating that loss of the antiscorbutic principle commences with the process of ripening.—Ali Hassan and Rizk Basili, *Biochem. J.* 26:1846, 1932.

**Vitamin C and the Suprarenal Cortex. I. Antiscorbutic Activity of Ox Suprarenal**—Supplies of fresh ox suprarenal were obtained daily or every second day from local slaughterhouses. In order to avoid possibility of adrenalin poisoning, only the cortex was fed. The antiscorbutic activity was determined by curative tests, and by the microscopic tooth structure method.

In the first test, male guinea pigs, weighing 250 g. were placed for a preliminary period of 10 days on a scorbutic diet of bran, oats, egg-yolk, salt and cod liver oil, alone, and then supplemented by 15 g. of cabbage. Graded doses (0.25, 0.5, 1.0 and 2 g.) of suprarenal cortex were fed and recovery rate noted. Graded doses (.75, 1.5, 3 and 6 c.c.) were fed at the same time to another test of animals. It was found that 2.0 g. of raw suprarenal cortex corresponded very accurately with 6 c.c. of orange juice, 1 g. with 3 c.c. and 0.5 g. with 1.5 c.c.

In the second experiment, young guinea pigs weighing about 300 g. were

given the basal diet with doses of suprarenal cortex at levels of 0.5, 1.0 and 2.0 g. To another set of animals orange juice was fed at levels of 1.5, 3 and 6 c.c. After 14 days the animals were killed and cross-sections of the roots of the incisors were prepared by the usual method.

Raw suprarenal cortex (ox) was found to be a more powerful anti-scorbutic than any natural source known and possesses three times the activity of orange juice. The degree of activity corresponds with the value predicted on the basis of the relative yields of hexuronic acid obtainable from the two sources. It is concluded that vitamin C is either identical with hexuronic acid or is a substance possessing a close similarity to it.

Preliminary results show that in guinea pigs the vitamin C activity of the suprarenal is lost with the onset of scurvy. It is supposed that vitamin C plays a special rôle in the physiology of the suprarenals.—Leslie Julius Harris and Surendra Nath Ray, *Biochem. J.* 26:2067, 1932.

**Vitamin A Content of Naturally Colored Nut Margarines**—This experiment was carried out to determine the vitamin A content of a number of nut margarines colored by the addition of palm oil. Male albino rats, 28 days of age, and averaging about 59 gm. in weight, were used. These were fed the

"colony diet" recommended by the vitamin assay committee of the American Drug Manufacturers' Association. When the body was depleted of vitamin A, which required about 4 weeks, different levels of nut margarines were added to the basal diet, and the experiment continued 8 weeks or until death.

Sufficient vitamin-free cottonseed oil was fed to each animal to make the total fat constituent of the diet one gram per day. To the diet of the animals which were used as controls were added different daily levels of butter. Records of the growth of the animals are given and it was thought some of the growth might be due to the vitamin A in the added milk. Some of the fat from each sample was freed from the salt, water, and curd.

An amount equivalent to the level required to produce an average gain of 3 grams per week was fed to a second series of rats. The average growth curves for these animals were practically identical with those of the animals receiving equivalent amounts of the original sample; this indicated that the vitamin A content was derived from the fat rather than from the added milk. From the results of this experiment it is concluded that palm oil shows promise as a source of growth-promoting substances in nut margarines.—Charles F. Poe and Hazel A. Fehlmann, *J. Indust. & Eng. Chem.* 25:402 (Apr.), 1933.

# CHILD HYGIENE

## SCHOOL HEALTH PROGRAM FOR THE VIRGIN ISLANDS OF THE UNITED STATES\*

SALLY LUCAS JEAN, F.A.P.H.A. (*Life Member*)  
*New York, N. Y.*

UNDER the able administration of Governor Paul M. Pearson, an efficient health department has been developed in the Virgin Islands. Dr. R. B. Stafford, the Director of Health, a member of the American Public Health Association, had had many years of experience in health department activities in this country before going to the Islands.

The population of about 22,000 is more than 80 per cent negro; the white group being chiefly of Dutch, English, Danish, or French origin. English is the language generally spoken. Twelve thousand of these people live on the island of St. Croix, while 500 are on St. John, and the remainder on St. Thomas from where governmental affairs are carried on.

Hospitals were established under the Danish administration before the United States purchased the Islands from them in 1917, and since then have been well administered by our navy, as well as by the civil government appointed in 1931. American and European trained doctors are in charge of the hospitals, each of which has established training schools where native girls furnish service under American graduate nurses. A leper hospital with about 80 inmates is under

the able direction of Dr. James I. Knott who serves not only as the director of health for one of the general hospitals, but is in charge of certain local public health activities.

It is thought that the brilliant sunshine probably accounts somewhat for the low record of communicable diseases prevalent, but the availability of medical, surgical, dental, and nursing services with organized welfare activities and a highly developed public health department, tells its own story. Few places in the world furnish as adequate health services as are available to the people of the Virgin Islands.

The school population of 4,000 have a health and dental examination yearly, and free dental as well as surgical and medical service are obtainable by them all. Elementary, junior, and senior high schools are well established and little pressure is required to secure regular attendance as the people desire education for their children. The teaching staff are largely native, supervised by white men and women trained in the United States. The educational standard for teachers is rapidly rising under the progressive and sane leadership of George Ivens, Director of Education.

To ascertain how the school children lived, many homes were visited with Miss Lucy Gillette, the Commissioner of Welfare, who has faithfully and wisely served the people for many years as a public health nurse under the

---

\* At the request of Governor Paul Pearson, the writer spent some weeks during January and February in the Virgin Islands assisting the health and educational authorities in the development of their school health program.

American Red Cross before being appointed in 1931 to her present post. Much time was spent in schoolrooms and in talking with teachers, as well as in conferences with educational and health officials. It was evident that many necessary factors of a school health program existed; indeed, more than are usually found in school systems of our highly organized states, but it was possible to suggest ways and means by which these could be coördinated and so serve more fully the needs of the children. Practical steps were also indicated for the improvement of school health environment and teaching.

The receptive attitude of the authorities leads me to believe that we may, at some not too distant day, find an ideal school health program functioning in these schools.

Though economic conditions are not good, the people seem very well nourished. Rice, fish, bananas, and sugar cane are their chief diet, but this is now being enriched due to the

encouragement which the government is offering whereby the people can grow and consume more vegetables. Fresh water is scarce because of the coral formation of the Islands, and the rain water is carefully husbanded in cisterns, but lack of water does not prevent the people appearing clean as to body and clothes. The sea is available to all and a definite effort is being made to encourage bathing in the sea regularly.

The beautiful bodily carriage noticeable on all of the islands can probably be attributed somewhat to the custom of carrying water on their heads, as well as other heavy burdens.

They are dignified people, courteous and polite, and have great pride in the magnificent natural beauty of their islands with deep green tropical growth covering the high hills.

The sapphire and emerald waters breaking on the coral strands made famous in poetry and song, are all here, with quiet, peaceful people proud of their citizenship in the U. S. A.

## CHILD HEALTH IN MINING CAMP AND VILLAGE

IN April, 1932, the Save the Children Fund of America requested Dr. Iva M. Miller "to make a survey of the situation as regards children's health in Harlan County, Ky., one of the most populous of the Southern Appalachian coal mining counties, where unemployment has rendered a difficult hygienic and sanitary situation even more difficult. To study the problem of children's health meant that a general survey of the whole community's health and environment should be made." Beginning with reports of the Bureau of the Census and the State Board of Health, and aided by the various physicians in the county and by city and county officials, educators, missionaries, pastors, business men, the State Health Officer and his colleagues, and the

Harlan County Save the Children Fund Committee, with Rev. C. E. Vogel, pastor of the Harlan Church, as Chairman, she proceeded to study Harlan County.

Among the significant facts discovered was this hint of the development of Harlan's coal mining activities, as seen in the growth of the county's population:

<i>Census</i>	<i>Population</i>
1890	6,197
1900	9,838
1910	10,566
1920	31,546
1930	64,557

The increase of 198 per cent in population between 1910 and 1920 is an index of the amazing—and as we see it now, the appalling—inflation of the coal industry during the World War. Some of the horde of new miners came from outside, but many came

from neighboring mountain counties. During the next 10 years the population more than doubled again, partly due to incoming migration, but also in considerable degree to the high birth rate, which in 1931 was reduced to a few points above that of the state of Kentucky as a whole.

The rapid increase of population greatly complicated the problems of sanitation and health. When a community thus greatly enlarged was stricken by a decline in the prosperity of the coal industry, throwing thousands of men out of work, and necessarily making the living conditions of their families worse, the results were disastrous. The preponderance of mine employees in the county is shown by the population distribution in 1930, which is given as, urban 6,596, farm 4,623, and rural non-farm, mostly miners and their families in small camps, 52,968.

In every community, it is possible to obtain a few relevant facts which are indices of the health of the community. Among these is the rate of infant mortality. If this is higher than that of an adjacent community or state, one or more of the several facts may bear part of the responsibility; either the drinking water is unsafe, sewage disposal is unsatisfactory, grade A milk is not available, or the child's food is not being selected, prepared, or administered according to the best ideas of hygiene and sanitation.

The water supply of the city of Harlan was found to be excellent, but that of the rest of the county more or less questionable; mostly wells and springs and, except in a few mining camps, uncontrolled. The county, like many another in the United States, discharges its sewage in the natural streams, all of which are therefore more or less polluted. Two large mining towns have modern plants; but many others are not so happy.

On the positive side the County Medical Society, with 50 members, was found to be a strong influence for health.

The physicians of the county are unusually well trained, and some are especially skilled in surgery. Their monthly meetings are well attended, and the programs presented are of a type which few county societies in America can surpass in quality.

Dr. Miller's report and recommendations—considerably more searching and voluminous than these few hints indi-

cate—seemed to win the full approval of the State Board of Health and the Save the Children Fund.

Realizing that bad health in the majority of cases results not from accident but from negligence or lack of knowledge how to use the means we have for good health, the Save the Children Fund decided to place a Child Health Demonstration in Harlan County, and asked Dr. Miller to serve as its Director. Florence Dunkelberger was engaged as Public Health Nurse, and W. S. Johnson as Sanitary Inspector—both experienced workers in Kentucky.

The work was begun in August, 1932. Outside of the city of Harlan, 8 child health centers for demonstration work were opened—in churches at Evarts, Cumberland, Black Mountain, Benito, Wallins Creek, Alva, Loyall, and Sunshine. Around these centers, committees of local women under Miss Dunkelberger's direction made contact with most of the mothers in the community and took a census of the children under six years of age.

Periodically every 4 to 6 weeks these centers are opened for conferences to examine children and to instruct the mothers. Just prior to the conference, a post card is mailed to each mother, suggesting that she bring Johnny and Mary and Susan and perhaps Ann to the church on the appointed day. And when 50 or 75 mothers show up, with from 1 to 3 or 4 children apiece, it means a busy day for the staff, even when, as in several cases, local physicians have generously aided the Director in giving the health examinations.

Attitudes as well as numbers make conference days difficult. The greatest stumbling block to progress is fear—fear not primarily in the mind of the child, but in the mind of the parent, from whom it is communicated to the child. The babies who have barely reached the point of elementary thinking have imbibed this traditional fear of doctors, and evidently suspect that the examination is going to be some sort of fearful ordeal. The result is that many of them yell, squirm and kick like mule colts, and doctor and nurse get pretty well pommeeled before the seance is over.

As an indication of the unfavorable conditions which were found among the first 400 children examined, all of pre-school age, it may be mentioned that

. . . 93 per cent of them needed immunization against smallpox, 90 per cent needed such



protection against diphtheria, 84 per cent needed cod liver oil, 68 per cent were receiving less than their necessary quota of milk, 37 per cent needed treatment for worms, not to mention several other items.

For those requiring cod liver oil—not a medicine for tubercular cases only, but a necessary food for a child from birth until he is 6 years of age, save during the summer when he can take sun baths—we gave to such parents as were unable to purchase it, sample bottles to last until our supply should arrive. A few days ago two tins of 5 gallons each came to Harlan as a gift for use among our neediest. A generous druggist is having it bottled for us and will aid in distributing it among those who can come to Harlan.

The mothers are instructed as to the health care and habits of the children, and those youngsters having physical defects are referred to their family physicians for correction. As soon as all physical corrections are made and the diet and health habits adjusted, so that they have no health liabilities, only health assets, these boys and girls whom we have examined are written off as Blue Ribbon children. They do not come to the conferences again save to be checked up before being reported. In this way we eliminate numbers. When all become Blue Ribboners, our work will be completed—or rather, it would be, save that new births will extend it a while longer.

Now that the mothers are learning the nature of our work, they are responding more heartily to the calls. Some bring boys and girls well along in their teens and beg to have them examined.

One thought on which we are hammering,

and which, if we put it over, will be one of the best effects of our work, is that of the value of the careful, unhurried examination made by the public health doctor when the child is apparently well, in contrast to the panicky, hurried and difficult examination of a child who has shown warning signs of illness for days and perhaps weeks.

Milk is a commodity which cannot be obtained in sufficient quantities in Harlan County. In 1920 the county had no dairies at all. This year there were 24, owning some 500 cows, while 3,500 more cows are privately owned. But still the milk supply is far below what is needed. There are 12,000 children under 6 years of age in the county and 23,000 under 21, that is, still in the growing period. To supply adults with their needed 1 pint a day and each child with 1 quart would require some 50,000 quarts—and the supply is fully 30,000 quarts short of that.

It is therefore planned to introduce milk goats into the mountain regions to supply families where there are small children. It is planned to loan one or more goats to a family until the members are financially able to take them as their own. A good milk goat should produce 1 gallon per day. Goat milk is rich in iron and some salts not found in cow's milk, and the cost of keeping a goat is very little, even in winter. It is hoped that a goat farm may soon be started at one of the settlement schools in the mountains where goats will be bred to supply the needs in several counties.—

Iva M. Miller. *Mountain Life and Work*, Jan., 1933, p. 5.

## PUBLIC HEALTH NURSING\*

**Behavior Aspects of Nursing Education**—Behavior is a hard topic to discuss because everybody feels able to express expert opinion on it. We accept data coming from the fields of chemistry, bacteriology, engineering, but we do not like it when the behavioristic sciences of psychology, psychiatry and sociology try to make us see ourselves as we really are. The

reason for this is that for hundreds of years the activities of human beings were ascribed to body, mind, and soul. Clergy and teacher took care of everything above the eyebrows, and activities originating there were called conduct. The doctor took care of everything below the eyebrows. Wundt, a German in the 19th century, first tried to apply scientific methods of approach in a study of human behavior. Now while conduct is a matter about which we pass laws and give advice, behavior is

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

a matter which implies only a casual interest in a human being's actions. Yet there must be a wealth of important facts behind various charges in the courts preferred against boys and girls under 16 years of age.

Psychology and psychiatry merge into each other because we are always dealing with varying degrees of abnormality. It is because we recognize in the neurotic, the insane, the feeble-minded and the delinquent so many of our own characteristics, that we feel so free to judge them and prescribe all sorts of advice for their welfare. "As a rule it is far easier to get over a new and unwelcome idea to a factory hand with a mental age of ten years than to put across a similar concept to a person who has practised a profession for years."

Most so-called educated people think gross irrationality is the only symptom of poor mental health, when the mental states that really do the most damage are "mental attitudes of rigidity in thinking, and of impulsive abandonment to emotional undercurrents of jealousy and egotism so often rationalized by the espousal of half-baked theories of omniscience."

Psychiatry has all the characteristics of an overgrown adolescent. The first school of psychiatry damned everybody because of his ancestors. That is now outgrown. The second school was that of focal infection, which thought that all nerves, irritability, tantrums and rage were due to terrible poisons in the large gut, which could be removed by colonic irrigations. The third school is that of endocrinology. We know little about the glands of internal secretion but we talk a great deal about them. The last school is psychoanalysis. All these schools contain important truths, but the danger is for each to regard its trend of thinking the one and only way of life.

Nursing schools in their striving to

be academic must not take over what progressive education is fast discarding. One great teacher-writer speaks of the overestimation of the function of books in the development of intelligence, saying, "A genuinely integrated learning and discipline cannot be attained without an integrated relationship of teacher and pupil."

We accept the principle of individual differences in courses in psychology, physics, and biology, but fail to act upon it in our human relationships. Much medical and nursing energy is expended trying to make fat people lean or lean people fat, when a thousand experts on every phase of growth and development in White House Conference Committees refused even to express an opinion as to what constitutes a state of nutrition. The mental health of an individual depends on his biology and temperament as much as on his intellect, yet education has attempted to standardize its products by evaluating intellectual ability alone.

Interest is increasing in the material taken into nursing schools. Raising educational standards does not entirely solve the problem. Usually the candidate's history and credentials give only an estimate of intellectual performance; personality and make-up are important, also. Personal interviews are perhaps most satisfactory in the right hands. The period of probation needs to be elastic in its expansion of doubtful material.

All Class A nursing schools recognize the necessity for practice and theory in psychiatry. Let the nurses study textbooks in psychology and psychiatry, but who has ever seen texts that deal with the really practical aspects of mental hygiene as they affect everyday living, such as jealousy and self-pity and difficulty in taking criticism, which give us all so much trouble in the management of ourselves and others?

There are matters too, that deal with good taste and manners and plain, common sense, but they are hygienic, nevertheless.

The nursing school curriculum is gradually paying more attention to practice and theory in the field of public health. This phase of preventive medicine has been considered post-graduate material, but because it deals with factors underlying poor physical, mental, and social health, it logically belongs in the undergraduate curriculum. Medical student and pupil nurse need to go with social science into the homes and schools to see conditions of living and education; to see how parents struggle for a livelihood and children get their start.

Social science today is far ahead of public health in its grasp of the problems of human relationships. Public health has doctors and nurses who see only the physical aspects of poor health, and only the problem of relief in social science, while they completely ignore the fundamental principles of social case work, which are so closely related to eugenics, social psychology, and progressive education.

Is it lack of interest, or professional inertia that makes it possible for public health to ignore the preventive side of a branch of poor health whose victims fill more beds in public and private hospitals in this country than all medical and surgical cases together? Although it is ethics for the nurse to go no faster than the doctor in professional vision, yet I believe that the public health nurse has a great chance in her daily work to drive home to public health medicine a larger concept of health than it has today.

A behavioristically intelligent nursing school faculty is just as important as selection of student material and construction of curriculum. Colleges and universities think it is the business of students to look out for themselves so they shy away from personnel departments which industry and big business have found practical. In the

larger nursing schools the educational director can serve as personnel director if she does not have too many students, but she needs to know the individual student nurse from the moment of her entrance to the day of her departure.

Beneath the failures and breakage of the world one invariably finds a long story of poor emotional balance—discrepancy between ambitions and capacities, a floundering with appetites and urges and personal consciousness of inadequacies.

Yes, the greatest value of any educational discipline is the training of the emotional life of an individual.—Esther Loring Richards, *Behavior Aspects of Nursing Education, Bellevue Quarterly*, Mar., 1933.

Miss Wald and Henry Street Settlement Have Birthdays—March 10 marked the 40th anniversary of the founding of Henry Street Settlement and the 66th birthday of its founder, Lillian D. Wald. On this occasion Miss Wald received at her country home in Westport, Conn., telegrams of congratulation from Governor Lehman of New York, and from President and Mrs. Roosevelt.

The first "Nurses' Settlement," later known as Henry Street Settlement, was founded in 1893 by Miss Wald and a coworker, both graduates of the New York Hospital Nursing School. These nurses, in relating their work to the social, economic, and industrial conditions that affected their patients' lives, gave an impetus to the development of visiting nursing. The Henry Street Visiting Nursing Service has served as a model for communities throughout the country. Last year its nurses made approximately 600,000 visits to 100,000 patients in New York.

Miss Wald lives at the Settlement at 265 Henry Street, New York, and is head worker and Head Resident.

The Settlement conducts clubs for boys and girls as well as for mothers and fathers of

the neighborhood; classes in arts and crafts, pottery, dancing, English, citizenship, home-making, first aid; clinics for the mothers and babies, the boys and girls; a music school in which courses are given in all phases of musical study; a theatre and dramatic workshop; social events for the young people; and in the summer time, camps for the boys and girls, a daily play school, and day outings for the mothers and children of the neighborhood.

The administrative headquarters of Henry Street Visiting Nurse Service where Miss Wald maintains an office, is at 99 Park Avenue in a fine building constructed under Miss Wald's leadership and presented to the Service by Mrs. Jacob H. Schiff in memory of her husband. Mr. and Mrs. Schiff were devoted friends of Miss Wald and took active personal interest in the Settlement from its earliest beginnings. Over the fireplace at 99 Park Avenue is this inscription:

This building is given in memory of Jacob Henry Schiff by Theresa, his wife, and is dedicated to the cause of public health nursing, which he long fostered, for love of progressive education, civic righteousness and merciful ministrations.

Nursing training and service as carried on in the hospitals in the '90's were divorced from the families in which their patients came. Miss Wald and her nurses gave nursing a new status by going out into the homes and, by giving hourly service, paid for by the family when possible, brought private nursing within the reach of those with small means or no means at all. The nurses responded to calls from the people themselves and from social agencies, but gave no treatment except under the supervision of a physician. Leaders in the medical profession supported this change of basis in nursing service, but it was fought vigorously by quacks. There has always been a huge field for this service since it has been found that 90 per cent of sickness is cared for in homes.

From the beginning of her nursing career Miss Wald was an insurgent and innovator in the care of the sick, the oldest of woman's functions. She was the first president of the National Organization for Public Health Nursing when it was founded in 1912. She was one of the prime movers in getting a generous endowment which made possible the Nursing Education Department of Teachers College, Columbia University. She brought the idea of school nursing from London in 1902 and offered the services of one of her nursing staff to give a demonstration among school children in New York City. After a month of the demonstration the city made an appropriation for the first public school nurses in the world. Now every English speaking country and many others have adopted school nursing. She made the first suggestions and moves which led to the formation of the Town and Country Nursing Service developed by the American National Red Cross in 1912. She initiated the idea of the Children's Bureau in Washington established by act of Congress in 1912.

It is difficult to measure the contribution Miss Wald has made to social welfare in this country and the world. An editorial entitled "Henry Street" in a New York newspaper referring to her says,

One has but to substitute her name for its English equivalent to make Wordsworth's lines offer suitable tribute to her on this her birthday:

"One impulse from a vernal wood  
May teach you more of man  
Of moral evil and of good,  
Than all the sages can."

#### REFERENCES

- Dock and Stewart, *A Short History of Nursing*, 1932, pp. 162, 165, 305, 312, 315.
- Biographical Sketch of Lillian D. Wald Henry Street Nurse Service.*
- Public Health Nursing Notes, *A.J.P.H.*, XX, 2: 218 (Feb.), 1930.
- Midmonthly Survey*, Mar., 1933, p. 111.

## EDUCATION AND PUBLICITY\*

### Motion Picture Memoranda—

Several memoranda of sources for securing pictures, information as to new pictures, and use of pictures. Supplied by Social Work Publicity Council, 130 East 22d St., New York.

"Motion Pictures—Sources for securing by loan, rental or purchase." 2 pp. 3 cents. Not a list of individual pictures or producers, but of free or inexpensive source lists, and new picture information sources. Pictures for entertainment or education in clubs, camps, institutions, etc. Makes accessible the wide field of 16mm pictures.

"Health Motion Pictures." 2 pp. 3 cents. Source lists and national health agencies supplying pictures. Supplementary to memorandum above.

"Amateur Movies." 5 pp. 6 cents. Why, where and how to make useful this exceptionally valuable instrument for the presentation of the health department, the health association, as well as personal and community health. Offers a project for high schools and colleges.

"List of Amateur Movies." 2 pp. 3 cents. Examples of pictures made on health and social work.

To readers of the *Journal* outside of Canada and United States: copies of above memoranda will be sent free without enclosure of postage.

**Publicity First Aid for Nursing Groups—**The Public Information Kit, designed for publicity chairmen of state, district and alumnae associations, is arranged in a fiber portfolio, compact and easily accessible, and contains a

table of contents, making it easy to put one's hand on the items wanted at the moment. Concrete illustrations of all the points made are listed. The "do's" and don'ts" of good radio speeches are given with mimeographed illustrations of what points a good radio speech should contain, and warnings of the difficulties of getting the "diabolic's" safely through the microphone.

Concrete advice as to physical make-up of a publicity release is given, as well as guidance in the actual content, and suggestions as to photographs and a method of keeping them. There are "fifty-seven varieties of public health nursing news" items listed which can be lifted bodily from the kit, and the locale and names of the board, etc., changed and used in any part of the country. In addition to this digest which can be elaborated on (happily for the publicity secretary who may be in need of ideas) several pages devoted to the preparation of feature articles, show how local color may be added to a news item to make it a good feature.—Stella A. Koenig, Henry Street Nursing Service. American Nurses' Assn., 450 7th Ave., New York. \$1.50. We wonder whether it would not have been better to perforate the various sheets and publications. Some of the users might then have put the contents into a loose-leaf binder. We expect to do this to illustrate the possibility when the Kit is shown at Education and Publicity Headquarters in Indianapolis. *We would like to hear of other such kits offered by national or state groups.*

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Routzahn, 130 East 22d St., New York, N. Y.

**Explaining Emergency Diets—**The explanation of emergency diets

seems to offer an opportunity for simple dietary instruction. Criticism of emergency dietaries by food faddists and the uninformed may be blunted by careful explanations of the foods allotted or suggested. Why certain items are useful, and others are not, may be stated in strictly non-technical language with a minimum of scientific information.

It seems important to make clear that we are dealing only with emergency conditions. There is danger in such a statement as that "no family needs to be undernourished today even if reduced to the weekly food order provided by the emergency relief funds." This was the lead sentence of a news release widely distributed in one state.

Dieticians and health agencies might well make clear that the adequacy of the relief diet depends upon the community. The specialists are merely helping to make the most of a bad situation.

**Some Instruments of Public Information**—Do you secure interest through variety in methods? Do you overlook desirable methods in carrying out a particular project? As an aid to affirmative answers to those questions we give a check-list to be cut out or copied for everyday use. Please suggest additions to this list.

1. Newspapers—News (general or departmental), letters to the editor or "Voice of the People," official statements or proclamations, editorials, picture page or rotogravure, feature stories, Saturday or Sunday magazine articles, advertisements.

2. Special local publications—Weekly, monthly or occasional publications issued by religious, club, business, school, or fraternal organizations, or addressed to a neighborhood or other special audience. These are called house organs, bulletins, magazines, news letters, and so on.

Articles in above. Publication of one of your own.

3. Publicity by mail or direct distribution—

Letters, enclosures with letters and packages, annual reports, reports of studies, posters and bulletin board posters, leaflets and folders, booklets and pamphlets, postal cards or post cards, announcements, invitations, etc.

4. Speaking—Talks at clubs, schools, industrial plants, etc., emergency mass meetings, annual meetings, board meetings, anniversary dinners, conferences, classes, invited groups at homes or clubs.

Radio programs.

Possibilities in all the above: Questions and answers, dialogues, plays, etc., etc.

5. Graphic and dramatic methods—Sight-seeing tours or visiting days, exhibits, window displays, contests, talking pictures, silent pictures (including amateur pictures), slides, plays, pageants, parades, demonstrations of methods.

6. Intensive campaigns—Money raising campaign; special educational day, week or month.

7. Personal contact—Personal calls; house-to-house canvass, telephone calls.

"On the Air"—A booklet bearing this title has been issued by the Medical Information Bureau of New York Academy of Medicine, 2 East 103d Street, New York. It seems to be of such practical value that we give it here in full. Copies in booklet form free from Dr. Iago Galdston, above address.

The radio talk stands in a category by itself. The radio speaker is faced with a number of conditions which he does not meet in his other talks. His radio audience is vast but unseen. He can draw no inspiration from the sympathetic eyes of his hearers. The average radio studio even robs one of the companionship of one's own voice, for the room is soundproof, all echoes are deadened, and one's voice sounds muffled.

The radio speaker's audience is mixed. He addresses the young and the old, the rich and the poor, the educated and the illiterate.

These special conditions make necessary a special technic in the composition and delivery of the radio talk.

To begin with, the radio health talk should be written out in full and never delivered from notes or extemporaneously.

Make sure that your manuscript is clearly written and that its pages are arranged in proper order. Before broadcasting, read and re-read your paper. While radio papers must be written out, they should not be read over the radio; they should be spoken. It is

therefore desirable to indicate by signs of one's own composition where special emphasis of tone and voice need be given to what is written. Such signs will help in effective rendition. They act like the markings on a music score.

Be brief in your paper, as a whole, and in sentence and paragraph structure.

Use simple language. Avoid technical and rare terms, or, if obliged to employ them, be sure to define them.

Do not try to cover too much ground in one radio talk. Be content with but one point, if need be, so long as you succeed in making that one point clear.

Summarize your talk at the end—but not in the form of a deliberate summary. Some may have tuned in on the middle of your talk and may wish to know what you said in the beginning.

Be very careful of what you say. Remember that your talk goes into the homes of laymen and is listened to by mixed company. The radio audience is squeamish, touchy, and finicky, and is hemmed in by many taboos. It is readily repelled by detailed descriptions of pathologic conditions and by gory pictures. Many scenes which are commonplace to the medical man are repulsive to the layman. The scientist in his enthusiasm for modern aseptic surgery, will say, "Not even the heart and brain are considered too sacred to be forbidden the exploration of the surgeon's knife." The lay person, when hearing this, is not as much impressed with the marvels of modern aseptic surgery, as he is repelled by the picture of the surgeon's knife exploring the brain or the heart.

Avoid, if you can, in the composition of your papers, direct reference to excreta, to bloody discharges, etc. If you must dwell upon them, use such expressions as will not offend the radio audience.

Avoid time-consuming preliminaries in your speech. Don't tell your audience what a wonderful thing radio is (they know it), or how nervous you are, or how grateful you are to Station XYZ for this marvelous opportunity, etc., etc. Greet your audience and plunge right in.

The informal tone of a conversational style of composition is very effective over the radio. Tell a tale, if you can. The radio audience is more interested in Mr. Jones around the corner who had a little growth on the lip which Dr. Smith advised him to have removed, which was removed in the Henry Street Hospital, and which was found to be a developing cancer, removal of which at an early date is a triumph of surgery, than it is in the plain fact that new growths on one's

lips are dangerous. Of course, all names should be fictitious, especially those of the doctor.

The radio audience is the news-reading public. Hang your tale, if you can, onto some current event with a health slant. Make your talks seasonal, or give a season value to your talks.

The first five sentences of the radio talk should be so written as to bait the listener and compel him to attend to the rest. Select your topics carefully, with a mind to the heterogeneity of your audience. Let your titles be provocative of curiosity and interest.

Speak your paper softly, clearly, slowly. Be especially careful not to swallow your last syllables.

Time your self beforehand, so that you need not hurry your cadence, nor leave the last few paragraphs of your talk unsaid.

You may talk standing or sitting. Most radio talks are better delivered while standing.

Be sure that the announcer has your "topic" properly presented in his introduction. Use only *one* title with your name.

**Another Health Education Institute**—A second time, so it is planned, a Public Health Education Institute will be held in connection with the Annual Meeting of the A.P.H.A.

Who will attend an Institute at Indianapolis in October? Where will they come from? What kinds of health work are they doing? Such information will help to confirm the idea and aid in the planning. If you would like to attend please drop a postal card to the A.P.H.A. Formal registration will come later.

**Teaching of Health**—Do you conduct classes, conferences, discussion groups, talks or lectures, or other forms of consecutive presentation of any phase of personal or community health to groups of children, young people or adults?

The Public Health Education Section and this department of the *Journal* would like to hear from health departments or associations, state or local, which carry any of the above in scout

troops, clubs of young people or adults, in a Y.M.C.A. or Y.W.C.A., recreation center, in offices or factories, or elsewhere.

*Especially would we like to know of such efforts in reaching those not already organized in groups.* Please tell how you find them and get them together in group form for consecutive presentation of personal or community health.

Also, do any other public or private agencies in your state present health in a series of sessions to organized or unorganized groups?

**Geography of the Health Education Institute**—The following had one or more representatives in the Public Health Education Institute, October, 1933:

Towns and cities, 54; states and provinces, 28; the latter grouped as follows: province, 1; states east and north, 12; D.C., 1; south, 9; west of the Mississippi, 5.

On the list by states the first figure is the number of cities represented; the second is the number of individuals:

Ontario, 2-2; Alabama, 1-1; Arkansas, 1-1; Connecticut, 2-4; D.C., 1-8; Georgia, 2-2; Illinois, 2-8; Indiana, 1-1; Iowa, 1-2; Kentucky, 3-3; Louisiana, 1-1; Maryland, 2-4; Massachusetts, 5-9; Michigan, 4-7; Mississippi, 2-3; New Jersey, 4-4; New York City and Brooklyn, 11; New York State, 7-9; North Carolina, 1-1; North Dakota, 1-1; Ohio, 2-3; Oklahoma, 1-1; Pennsylvania, 5-9; Rhode Island, 1-1; Tennessee, 2-5; Texas, 1-1; West Virginia, 2-3; Wisconsin, 1-1; Virginia, 1-1.

**"The County Fair Is Next Week"**—"Where can we get an exhibit?" "Send us an idea for our exhibit?" Before long these and similar questions will reach state and national health agencies.

*Now is the time to start planning for the county or state fair.* And a well planned exhibit is more important this year than ever before.

Will national agencies and state de-

partments and associations now remind their constituents that requests for ideas and information are due several months before the fair dates?

**Health Education in Boston**—Ruth I. Parsons and C. E. Turner made a study of the school and out of school health education during the school year of 1931-1932, which is reported in *New England Journal of Medicine*, 8 The Fenway, Boston. Jan. 5, Jan. 12, Jan. 19, 1933. 25 cents each issue.

The aims of this survey have been threefold:

1. To determine what agencies are carrying on Health Education in the city.
2. To determine the quantity, quality and adequacy of the work which each is doing.
3. To suggest ways of strengthening the present program of Health Education.

This study was made by the Health Education Research Laboratory of M.I.T. at the request of the Boston Health League. It offers a detailed picture of health education activities by governmental and voluntary agencies, including "organizations whose field is broader than the city of Boston but which contribute directly to health education in the city."

It is recommended "that the Health Education Committee of the Boston Health League should function as a Health Education Council."

A reprint of the three articles from Boston Health League, 43 Tremont St., Boston, Mass. Send 5 cents to cover postage.

#### MEETING DEPRESSION

**"A Half Century's Health Progress,"** in *Crusader*, Wisconsin Anti-Tuberculosis Assn., Milwaukee. Dec., 1932. Conditions in 1882 and 1932 contrasted. This illustrates one possibility of emphasizing health progress and the importance of present-day health services.

"The School Superintendent and the Health of Children in the De-



pression," by Dr. Thomas D. Wood, Joint Committee on Health Problems. The title might be changed to "The Community and the Health of the School Child in the Depression." National Education Assn., 1201 16th St., Washington, D. C. Samples *free*; low rates for quantities.

Selected mortality figures for 1914 and 1932 appear on cover page of *Health Bulletin*, North Carolina State Board of Health. March, 1933. Part of the editorial application follows:

You want to remember that the better record of 1932 is not an accident. It is the result of persistent, intelligent, scientific efforts. Any lapse in vigilance may mean the return of typhoid fever in every community this or next year. But public health protection, like police and fire protection, costs some money. Are you willing to make the small financial sacrifice necessary for your own safety?

Here are some figures being quoted in New York State: The school district expenditure dollar in New York State, 1931, included the following: health, 1 cent; sanitation, 4.5 cents; recreation, 1 cent; highways, 14.5 cents; education, 37.5 cents. This according to Bureau of Municipal Information, Albany.

A strong plea to halt budget cuts, from *Birmingham's Health*, Birmingham, Ala. Dec., 1932:

In 1932-33: 5 white nurses, to serve distress and educate in health, an area greater than the sovereign State of Rhode Island—two sanitary inspectors, to police a county 50 miles long and 30 wide, and in addition to post quarantine over every case of communicable disease therein—2 food inspectors, to cover every food store, jobber and distributor, every restaurant, every alley hot dog stand in the Fourth City of the South—one quarantine officer to quarantine every case of disease in that city of 300,000, and to do it within an hour or so after its reporting—

But why continue? Citizens of Birmingham are proud of their Department of Health; confident that it is so adequate that never again can pestilence threaten!

More than any other phase of the business cycle, a great depression strains all the facili-

ties of a department of health. More calls for nurses—tremendous increase in the demand for laboratory service—a thousand problems for inspectors—the increasing watchfulness necessary of the unscrupulous anxious to cut corners at the price of the public's health—all these and many other demands arise in a continuous crisis in which the department of health is expected to act promptly and decisively. In grave danger is that city whose health forces meet that crisis with full half their resources gone!

There is an opening now for exhibits in popular teaching. Displays might be worked out to teach wise food buying for the average family, as well as displays showing the reasons for the food combinations recommended for inadequate relief budgets. Also displays showing how to make relief food diets as palatable as possible, are well worth while.

Such displays may be arranged at neighborhood centers of various types. Staff members need give time only to stimulating the idea. The displays may well be carried out by volunteers, with a dietician or home economist as consultant. The possibility of enlisting students in home economics is illustrated by "A Demonstration of Wise Buying," by Heywood and Potter, in *Journal of Home Economics*, Baltimore, Md. March, 1933. 30 cents. The plans outlined could be adapted to other cities. Probably some of the suggestions could be applied to relief diet displays. When such displays are presented to non-relief groups their emergency nature should be emphasized.

"Community Programs for Subsistence Gardens," by J. C. Colcord, is due for publication by Russell Sage Foundation, 130 East 22d St., New York. Intended to guide local relief groups. Deals with "First Steps In Setting Up a Garden Program," "Main Problems of Organization," "Working Conditions and Supervision," etc. It does not deal with strictly horticultural problems.

## NEW OR DIFFERENT

*National Health Review*, Dept. of Pensions and National Health, Ottawa, Ontario. A new quarterly, substituted for former monthly bulletin. A new editorial policy calls for one leading article an issue, news from the provinces, and classified "Abstracts of Current Public Health Literature."

*New Mexico Health Officer*, Santa Fe, N. M., has changed from monthly to quarterly issues; increased number of pages; added colored paper covers.

*Child Health*, Oregon Tuberculosis Assn., Portland, Ore., will continue as a bi-monthly.

*Erie County Echo*, Health Education Service, Buffalo Tuberculosis Assn., 708 Ellicott St., Buffalo, N. Y. "Health Teaching Suggestions for Teachers." Mimeographed. Sample, 3 cents.

*Canadian Health*, published quarterly by Canadian Social Hygiene Council, 105 Bond St., Toronto. 50 cents a year. "Devoted to the promotion of personal and community health."

*The Health Officers' World*, International Society of Medical Health Officers, 505 West Cherry St., Milwaukee. Quarterly. \$1.00 a year.

A semi-monthly *News Bulletin*, Ohio State Dept. of Health, Columbus. To supply news copy for use by health commissioners of the state.

*News-Week*, 1270 7th Ave., New York. More or less like *Time*. To be added to some mailing lists.

## TRAINING

A social hygiene study course appearing in *Public Health Nursing*, 450 7th Ave., New York (starting with July, 1932, issue), is available as 8

reprints at 10 cents each. Intended for group discussion or individual study.

A "Study Program in Publicity for Board and Committee Members," appearing in *Public Health Nursing*, starting with Sept., 1932, issue, is available as reprints at 10 cents each. Already issued: "Outline for Analysis of Past Year's Publicity"; "Interpretation: Why, What, Who"; "Newspaper Publicity"; "Feature Stories and Special Column Material"; "Public Speaking"; "Use of the Radio"; "Exhibits." The series will total 9 sections.

Both of the above courses should be useful beyond the nursing field.

## DATES AHEAD

May 14, 1933—Mothers' Day. Address: Maternity Center Assn., 1 East 57th St., New York, for plans and materials.

## REPORTING

"Investing In Health" is a review of the activities and services of the Welfare Division of Metropolitan Life Insurance Company, New York. Includes 8 diagrams of death rates, 1911-1932. Free.

"Palama's 1932 A Great Year" is Philip S. Platt's annual report for Palama Settlement, Honolulu. It is a 4-page, letter size folder, with display, pictures, "What Our Work Cost," significant statistics, "Extra Dividends" through "varied services rendered the community by Palama staff workers outside the routine of their work," and a first page letter addressed to "the multitude of Palama Settlement's friends who receive this report." By using old cuts, but one, the 5,000 copies cost 4 cents apiece.

## BOOKS AND REPORTS

Report of the Water Resources Commission of Maryland to the General Assembly of Maryland.

A report to the General Assembly of Maryland by the Water Resources Commission of that state, setting forth recommendations as to the policy, legislation and methods of financing for the preservation of the water supply resources of the State of Maryland is noteworthy in many respects. The Commission was charged with the duty of

. . . reviewing the underground and surface water resources . . . and of formulating a plan for the preservation, allocation, control and regulation of such water supply resources for the maximum public benefit, safety and use.

The Commission fulfilled its duty. In spite of the very complete, comprehensive mass of related data collected, the summary is reduced to a little more than 1 page and the single recommendation to 1 sentence. However, the brevity of the recommendation does not detract from its importance. This Commission recommends the creation of a permanent water resources commission for the state with general powers to formulate

. . . a water conservation policy, to control the priority, purpose, period, place and quantity of use of water, and to provide for continuity of stream gauging and for the supervision of dams.

One of the most important compilations of information in the report is that showing the water resources control in all of the states. Briefly it summarizes statements of pertinent legislative authority. Maryland is shown to have no body controlling water and water structures and development and conservation. With this knowledge the

suggestion of this Commission has much greater importance. In this day it is of interest to note that because of collaboration between existing state officers, this Commission was able to turn back almost half its appropriation of \$5,000. ARTHUR P. MILLER

Report of the Medical Research Council for the Year 1931-1932—*London: His Majesty's Stationery Office, 1933. Price, 2s net.*

This report is full of interesting information on almost every medical subject. The research work of the Council is reported under 7 heads, and being in the nature of a summary, does not lend itself readily to review.

We note with regret the opinion that the common belief that the Manson-Ross discovery had rid the world of malaria has had a bad effect in checking the development of research work. Although 40 years have elapsed, the indication is that there are more cases of malaria today than formerly, and the financial loss due to the disease is incalculable. The world uses approximately £2,500,000 worth of quinine annually, of which more than £450,000 worth is consumed within the British Empire. It is estimated that 47 million cases of malaria could be effectively treated with the amount of quinine purchased in the world. Studies are constantly being made on the new synthetic compounds for the treatment of malaria.

The work on dog distemper has been closed because its object has been achieved. The incidence of distemper among 650 inoculated animals has been only 1.4 per cent, with 0.3 per cent of deaths, against practically 100 per

cent formerly, with a death rate running from 50 to 75 per cent. The money for this work was supplied by the Field Fund, of which some \$75,000 was contributed by the United States.

Maternal mortality continues to be a problem, and excellent steps have been taken to study the disease and bring it under control. Vitamins also continue to attract much attention, as do virus diseases, bacteriophages, etc. Owing to new methods, the tubercle bacillus is yielding its chemical secrets.

Nutrition receives the due amount of study and the relation of dental disease to diet is still under competent investigation. Indeed, as before said, there is scarcely any subject of interest to the medical profession to which reference is not found, and this includes prevention as well as treatment, both medical and surgical.

The grant-in-aid fund by Parliament for the period of the report was £139,000—£9,000 less than for the preceding year.

The report is valuable also on account of the references given, many articles having been already published in various journals.

MAZŸCK P. RAVENEL

100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics—By Arthur Kallet and F. J. Schlink, *Consumers' Research, Inc.* New York: Vanguard Press, 1932. 312 pp. Price, \$2.00.

Fact and fancy run riot in this "hard-hitting book by two technical experts," as it is called in the blurb on the cover. Much of the hard-hitting seems unfortunately to be below the belt, and the technical qualifications of the writers, who are stated to be engineers, seem to be more pronounced in the art of sensationalism than in the sciences of chemistry, biology, medicine, and public health.

The impression created by this book

is that all fruits and vegetables are dosed with arsenic and lead, and all dried fruits with sulphur dioxide, that all bakery products and meats are bleached or preserved with dangerous chemicals, that most milk comes from tuberculous cattle, that all food and drug manufacturers are mercenary and dishonest, that all advertising agencies are unethical if they are not liars, that the Federal Food and Drug Administration is incompetent, and the law under which it operates is ineffective. This is a conservative statement of some of the immoderate charges with which the book is replete.

Mixed with these many intemperate and exaggerated assertions is some really valuable material on certain arrant quackeries. The chapters on cosmetics, on prescriptions and poison, and on fakes and frauds generally, are sound and sensible, although characteristically rabid. Many of the data are taken from the *Journal of the American Medical Association*, the advertising pages of which are, nevertheless, caustically criticised for their alleged inconsistencies and impurities.

The Federal Food and Drugs Act may be full of defects as the authors declare, but the remedies they so blandly propose are likewise neither practical nor constitutional. Among their weird suggestions is that the enforcement of an improved food and drugs act be transferred to a new Department of Public Health and Education, because "production and financial interests" dominate the present administration and also the Public Health Service.

Such a charge is fatuous, as anyone with the brains of three real guinea pigs who has dealt with these agencies and worked with them will appreciate. The constantly recurring strictures in this book on the motives of the Federal Food and Drug Administration and the innuendoes regarding the efficiency and

honesty of its officials are grossly unfair and unwarranted.

Like much of the material that emanates from Consumers Research, Inc., this book is interesting, entertaining, and somewhat instructive, but extremely unreliable. It represents a vast amount of research, much of which could have been utilized to better advantage. It presents some valuable facts which may help to jar the public out of its customary complacent attitude toward quacks and charlatans, but too many of the data are fantastically exploited and erroneously interpreted. Probably for that reason the book is already more or less of a best seller. Sanitarians may enjoy reading it, provided they do so with an open mind.

JAMES A. TOBEY

*Health Stories, Book One—By Anna B. Towse and William S. Gray. Chicago: Scott, Foresman and Co., 1933. 144 pp. Price, \$0.60.*

What with the mauling teachers are receiving in many quarters, this is, first of all, a cheerful looking book. That is something very important these days. The 97 pictures are the more attractive through the generous use of colors. There are birds, dogs, ducks, and flowers which the children love and pictures also of occasional vegetables which they do not always like so much. Even the child stamping through the rain on page 50 is smiling under his umbrella. These pictures have a lilt about them which is in keeping with the cheerful presentation of the subject matter.

This book is a supplementary reader plus, and is intended for first grade children. It is part of the Curriculum Foundation Series. The 489 words comprising the vocabulary used have been screened in accordance with a yard-stick called the Elson Basic Primer. The authors have tied together specialized vocabulary and specialized

skills, both simple, and both attractive. There is no confusion of ideas, nor has any effort been made to present too many of them at the risk of bulging the child's head. The subject matter used is nicely arranged to fall within reach of the first grader's understanding, appreciation, and practice.

If the present scheme of things demands more work of teachers at less pay, then at least teaching instruments should be kept sharp. The material in this book is so organized as to facilitate its use. There are five units—each one on how to do something; keep clean, care for yourself, grow strong and healthy, keep well, and keep out of danger. Once it is placed in their hands, I suspect many children will request the privilege of taking the book home to show father and mother.

W. W. PETER

*The Fine Art of Living—By Daniel S. Sager, M.D. Philadelphia: Dorrance, 1932, 215 pp. Price, \$2.00.*

This book is written in simple, popular style for the average lay reader. It treats of the general subject of Personal Hygiene in a simple and elementary manner. Twenty-one of the 35 chapters are devoted to various phases of the nutrition problem including brief mention of vitamins and the place of such foods as eggs, meat, fruit, nuts, cereals, vegetables, sugar, and milk in the diet. Other chapters deal with breathing, bathing, outdoor life, the nature of disease, indigestion, constipation, appendicitis, and long life. Several chapters are one or two pages in length and the average chapter length is about six pages.

The book is without illustrations. It contains no new information for the professional worker. It does not prescribe drugs although it suggests home remedies and hygienic procedures for such conditions as constipation, appendicitis, and overweight. Individuals

would doubtless differ with the author on minor points but the book in general presents commonly accepted facts of hygiene in a simple and readable manner.

C. E. TURNER

**Popular Science Talks—Philadelphia College of Pharmacy and Science, 1932.** 319 pp. Price, \$1.00.

For several years this Philadelphia institution has collected in one volume the popular science essays given by the college faculty during the preceding season. Although health topics form but a small part of the many fields explored, many of the other subjects are closely related, like physiology and chemistry. The sanitarian will find much of practical value in many and much of interest in all of the dissertations.

Judging from the current number, a library of the complete 8 volumes would give the health worker a readily utilizable source of material for preparations in the many fields of learning in which he is supposed to have ideas. Only a veritable walking encyclopedia of science could pass judgment upon the validity of such a diverse collection of treatises. But one can testify to their readableness and interest.

R. S. PATTERSON

**Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis—By B. S. Kline. Baltimore: Williams & Wilkins, 1932.** 99 pp. Price, \$2.50.

The technical procedures are very adequately presented. Care has been exercised to provide detailed directions which will be welcomed by those wishing to obtain results entirely comparable to those of the author. The means for securing uniformity of the physical state of the diluted antigen is of particular interest.

Some of the tabulations might have been improved had sufficient blood

been collected in all instances to permit the entire series of tests to be made with each specimen.

In addition to the microscopic slide test, a method for a macroscopic procedure is described in which the precipitate collects in the form of a globular mass thus permitting the results to be very easily determined. The use of the centrifuge to hasten the reaction is a distinct contribution.

The conclusions drawn from the comparison of the complement-fixation and precipitation tests performed with the same antigen are open to question since the type of antigen which may furnish optimum results with one of these forms of technic may be entirely unsuitable for the other.

RUTH GILBERT

**Correction of Defective Speech—A Complete Manual of Psycho-Physiological Technique for the Treatment and Correction of the Defects of Speech—By E. B. Twitmeyer, Ph.D., and Y. S. Nathanson, Ph.D. Philadelphia: Blakiston, 1932.** 413 pp. Price, \$3.50.

The authors present a "technique for the correction of all types of speech mutilations" without making any claims in defense of a specific theory. Nevertheless they find a "common factor" which is present in most of their cases: "a disturbance of the normal rhythm of breathing, not only of the costal and diaphragmatic excursions, but also as these, in turn, are synchronized with the modulating adjustments, of the peripheral organs of speech." They emphasize: (a) correct breathing exercises, (b) correct kinaesthetic imagery (oral positions), (c) combinations of (a) and (b) in speech output. The corrective material is arranged so that "no new sound appears in the exercises until the teaching and learning of the previous sound has been acquired." There are distinct

gaps in the evaluation of personality functions and of the total situation in which certain disorders of speech arise.

No attempt has been made to classify speech defects or to describe what constitutes a specific disorder of speech. The etiological topics (Deafness, Amentia, Brain Injury, Anatomical Anomalies of the Organs of Speech, Negativism—"pathological stubbornness") are dismissed with bare descriptive references.

The greater part of the book is composed of carefully selected exercises which are directed toward body coördination, breathing, vocalization, and includes corrective material for the peripheral organs of speech, articulation and integrated speech. An addendum contains suggestions for the treatment of "imitatory acts" by means of a scoring system which is kept by the patient. Here also the personality factors and total situation are minimized in the attempt to lift the act into the field of "volitional performance."

The book is essentially a manual of defective speech training and as such can be recommended for its suggestions as to technic and its excellent collection and arrangement of corrective material.

JACOB H. CONN

**Poliomyelitis—Survey by The International Committee for the Study of Infantile Paralysis.** Baltimore: Williams & Wilkins, 1932. 562 pp. Price, \$6.00.

The International Committee for the Study of Infantile Paralysis organized by Jeremiah Milbank has summarized the available knowledge and the results of its own investigations in book form. The organization of the material has been performed excellently so that the subject matter presents the disease as a whole. It is divided into chapters concerned with the history, etiology, resistance and immunity, symptom-

atology, treatment, pathology, and epidemiology, each of which is extremely well written. There are an extensive well-keyed bibliography and a detailed index. Poliomyelitis is really summarized in this work which is highly recommended. EDWIN O. JORDAN

**Nutrition Service in the Field—Child Health Centers: A Survey—Report IC of the Committee on Medical Care for Children of the White House Conference on Child Health and Protection.** New York: Century, 1932. 196 pp. Price, \$2.00.

Two reports on Child Health and Protection are included in this volume. The first section of the book presents the findings and recommendations of the Sub-committee on Nutrition, of which Lucy H. Gillett was chairman. The place, qualifications, and training of the nutritionist in the field of child health are defined clearly. Her services are summarized under the following heads: (1) Promotion and general educational work in the community. (2) Organization and executive work. (3) Instruction, supervision, and consultation—interpreting scientific facts. (4) Direct service—advisory service for individuals and families in connection with nutrition and budget problems. (5) Research—planning and conducting research in the field. Examples of outstanding nutrition services in national, state, and local communities are described, and a section is given to nutrition work in hospitals and dental infirmaries.

The second part of the book is devoted to the report of the Sub-committee on Health Centers, which was presented to the Conference by Dr. J. H. Mason Knox. It is replete with interesting information based upon an extensive study of child health centers throughout the United States and its possessions.

The report defines a health center as "a place where infants and children are examined and parents or guardians given such advice as will promote and protect the health of their children. The service in a typical center is preventive and does not include the treatment of disease." The geographical distribution of 1,511 health centers with the source of support is given in tabular form. The nature and scope of the centers are indicated.

An excellent summary with recommendations is included. The appendix contains a copy of the questionnaire, an analysis of the centers receiving white and negro children, and health centers in Hawaii, Porto Rico, Alaska, and the Philippines. RICHARD A. BOLT

**Endocrine Medicine** — By William Engelbach, M.D. Foreword by Lewellys F. Barker. Three volumes and an index volume. Springfield, Ill.: Thomas, 1932. Price, \$35.00.

This treatise comprises the results of Dr. Engelbach's observations during his life as a teacher and investigator. While a great deal is naturally the result of the investigations and clinical findings of a host of others, yet he has so woven his own observations in with these, that as a result, we have the most instructive system of endocrinology published in recent years. Certainly nothing of its magnitude has been attempted since *Endocrinology and Metabolism*, by Barker, Mosenthal, and Hoskins, appeared in 1922.

In Volume I, the author discusses briefly the history of this branch of internal medicine, followed at considerable length by the organology and the physiology of the endocrine system. Following this come etiology, diagnostic procedures, and the relationship of endocrinology to general medicine and the several specialties. Lastly, there is a discussion of the relationship of endocrine disorders to public health.

In writing of the relationship of endocrinology to general medicine, it is pointed out that there are few of the various systems in the body that are not affected in some way by this system of glands.

While the treatment of the public health aspects of endocrinology is all too brief, the point is made most emphatically that much can be done by everyone in the several branches of medicine, especially by the general practitioner, to prevent the economic waste and human sorrow due to endocrine disturbances. At a very conservative estimate, the condition of 782,000 of the 10,000,000 defective children in the United States is due directly to endocrinisms, and to a certain extent, these disorders play a part in other forms of defectiveness. From this standpoint the appalling cost of this condition to the taxpayer is emphasized.

In few instances in works of this kind, outside of books devoted to psychiatry and child guidance, does one find such a frank recognition by the author of the bearing of endocrine imbalance upon the social reaction of the child. This brings in its wake the many problems of maladjustment, incorrigibility, crime, and other types of social ills. Special emphasis is here placed upon the need for more careful prenatal and postnatal care from the endocrinological aspect so that these defects may not all be transmitted to succeeding generations.

Volumes II and III are devoted to the consideration of the clinical aspects of endocrine dyscrasias in the infant, the child, the adolescent, and the adult respectively. Here the author makes free use of numerous pictures, tables, charts, and case histories to clarify the subject matter of the text. Of special interest are the excellent anthropometric tables which the author has worked out for the tabulation of growth abnormalities.



It would seem that the subject has been treated in quite a voluminous manner. Such, however, is not the case. No doubt much more could be written which would be helpful, yet the exposition of the subject is excellent.

Certainly no recent work upon the subject of endocrinology has given the medical profession such a complete review as has this work. Free use is made of experimental physiology to help clarify this most complicated subject. For this reason, it should appeal to the clinician as well as to the worker in pure science. While the discoveries of the future may modify or change certain concepts, yet the attitude of the author is that of one trying to base his opinions upon facts proven in the laboratory, instead of indulging in hypothetical conjecture.

If any criticism is to be offered, it would seem that too little attention has been given to the subject of the suprarenal and its diseases, especially in view of the recent work done upon this gland.

The physical make-up of these volumes is excellent, the printing easily legible, and the illustrations profuse and adequately illustrative of the various endocrinopathies.

EDGAR D. BASKETT

**International Health Year-Book, 1930, Vol. VI—*League of Nations, Geneva, 1932. Available in the United States only through the World Peace Foundation, 40 Mount Vernon Street, Boston, Mass.*** 1100 pp. Price, \$6.00.

This sound and thorough report upon the status of the world's health during the year 1930 presents a record of outstanding value for the use of reference libraries and for statistical and administrative departments of public health agencies and organizations. The statistical section gives data for each country on population, births, mor-

tality, causes of death, infant mortality, and special information which may be available in individual countries reflecting health status in some particular field. A second section of the report for each country describes the campaign against those acute and chronic diseases which are receiving most attention from public health authorities in the country in question.

Each country reports also upon its activities in the field of social medicine and public health, presenting a description of activities of special interest in relation to such topics as Maternity and Infancy, Health Conferences, Training of Personnel, Demonstrations, Sanitation, School Health, Health Education, and Industrial Hygiene. Some countries report upon hospital, sanitary, and other activities in the field of curative medicine. All report upon public health legislation and the budget. The tables are well organized and systematized. The factual material is carefully selected, and clearly stated.

The countries covered in the report are Australia, Belgium, Bulgaria, Chinese Republic, Czechoslovakia, Denmark, Egypt, Estonia, Finland, France (including French Colonies), Germany, Greece, Hungary, Irish Free State, Italian Colonies, Japan, Latvia, Lithuania, Mexico, The Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Switzerland, Turkish Republic, Union of Soviet Socialist Republics, United Kingdom (England and Wales, Scotland, Northern Ireland), United States of North America, Yugoslavia.

C. E. TURNER

**Cancer Then and Now—*New York City Cancer Committee, 1932.*** 80 pp. Price, \$1.00.

An interesting and informative pictorial exhibit on cancer was prepared in 1931 by the energetic New York City Cancer Committee. The material, consisting of charts and photographs

depicting the development of our knowledge of cancer, has been assembled in this attractively printed pamphlet. Each chart has been supplemented with a brief essay on some aspect of cancer control, prepared by an authority in the particular field. While less complete than recent popular texts on cancer, this excellent pamphlet will prove to be invaluable to any person concerned with the prevention and cure of malignant diseases, and it will be of general interest to health educators.

JAMES A. TOBEY

**Your Hearing: How to Preserve and Aid It—***By Wendell C. Phillips, M.D., and Hugh Grant Rowell, M.D.* New York: Appleton, 1933. 232 pp. Price, \$2.00.

This is an excellent book, informative and instructive to the deaf, to physicians, especially those in school work, to the social worker, the psychologist, and the layman in general. The style is never stilted nor confusing; the presentation of the various problems is scholarly and could well be imitated in treatises of a strictly medical nature.

There is given a view of the wide extent of deafness, estimated at 3,000,000 school children and 17,000,000 adults. Full discussion follows of the causes of deaf-mutism and the usual degrees of deafness. The hearing apparatus, its anatomy and functions are illustrated and explained. A very complete description of methods for testing hearing, especially the various forms of electrical audiometers, is given, with an explanation of their use and value in different cases. Next is a discussion of the types and classifications of deafness, and an honest statement of the ability and limitations of the physician in treatment is given. Then comes an important chapter on the care of one's own ears with advice, and warning of the dangers of self-treatment. Of particular interest are

the pages on the dangers of bathing, diving, polluted waters, colds, and contagious diseases.

In the chapter on education of the hard of hearing, special stress is laid on the concept that they are to be regarded as mentally normal, and, for psychological and pedagogical reasons and results, should be educated not alone, but with other children.

Good description and history of lip-reading, its applications and values, gives an insight into this method of approach. Particularly important is a full discussion of possible resultant mental abnormalities, their recognition and adjustment by proper and experienced employment agencies, and modern programs of conservation of hearing. Of interest and value to the industrial worker are the chapters on the hazards in the metal, textile, transport, and building industries, regulations against hazards, and lists of favorable trades for the deaf. A chapter deals also with the problems of home and marriage. Especially instructive are chapters on the mechanical and electrical apparatuses that may aid the deaf, which give tests to safeguard the purchaser against improper choice, and warn against the quackery of playing on the hopes and ignorance of the deaf.

JEROME MEYERS

**Hookworm Infection—***By Clayton Lane, M.D.* London: Oxford University Press, 1932. 319 pp. Price, \$6.25.

This work is a monument to one who has done extensive personal investigation in a peculiar field of medical science. The author is to be commended for his distinctness and clearness of expression. The homely comparisons vividly deliver pointed facts to the reader. The chapter on diagnosis is particularly comprehensive, of practical value to the clinician and records much personal research. The author's

investigational records may well stand as a guide to the scientific control of tests and technic. The contents of the entire volume should be familiar to every hygienist, and the chapter on prevention should be made known to landlords, mine operators, property owners, renters, landworkers, agriculturists, and all others responsible for the proper disposal of feces, and the tenets prescribed be rigidly enforced.

While the author lists and describes infection in man occurring by mouth, it is peculiar that in the chapter on prevention he does not discuss the means of guarding against this. To the reviewer there are two outstanding sources of such oral infection—that of the clay eater, and that of the consumption of raw vegetables and soil contaminated raw fruits—both of which may become infectious by night soil, natural privies, or dissemination from other unsatisfactory privies.

The book carries an extensive bibliography; and its contents are well grouped under distinctive headings and sub-topic headings.

M. PINSON NEAL

*How to Budget Health—By Evans Clark. New York: Harper, 1933. 328 pp. Price, \$4.00.*

Here is the specific proposal toward which the accumulating volumes of research have been pushing us. Evans Clark with the practical urge of the Twentieth Century Fund behind him has summarized and interpreted the reports of the Committee on the Costs of Medical Care, and then pictured the application of the major recommendations in terms of persons and services and dollars.

In the 15 chapters and helpful appendices the author has concentrated an abundance of sound sociology and economics. Of course he does not propose a health budget, and he uses the term "guild" in a way that varies from

the connotation of the ancient professional and trade guilds of Europe, but he does create a trustworthy background of fact, quoted largely from the publications of the Committee on the Costs of Medical Care, and then he leads the reader through the common experience of haphazard payment, and uncertainty of quality of medical care today, to look with some hope and ambition toward a better medical responsibility and a more reliable basis of payment by patients.

Evans Clark proposes the creation of groups of physicians associated for service through the facilities of a hospital of the community used in common by them, to offer to groups of potential patients of the local population all necessary medical treatment and diagnosis for preventive care as well, at an agreed annual or monthly fee on the basis of voluntary insurance without the intervention of government dominance or of commercial exploitation.

Between no other covers can one find in so small a compass so useful and stimulating a proposal, certain to be pondered seriously by both doctor and patient, that is, by all of us.

HAVEN EMERSON

*Books for Tired Eyes—(2d ed.) Compiled by Charlotte Matson. Chicago: American Library Association, 1931. 59 pp. Price, \$.50.*

This brief volume presents a listing of books printed in 14-point type, got up especially for those who find smaller type fatiguing. The list includes topics under the following headings: Fiction; Biography; Travel, Adventure and Out-of-Doors; Literature; History; Books of General Interest; Books for Young People. Also included is the Clear Type Series—books printed in 24-point type which are in general use in sight-saving classes, where only the most legible of type can be utilized.

ISOBEL JANOWICH

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**High Calcium, High Vitamin Diet**—"The average American dietary is poor in calcium content. . . . Without milk or cheese in the diet it is difficult to obtain the needed calcium through food alone. Utilization of calcium is ineffectual, even with a sufficient calcium intake, unless the factors that control the absorption of calcium are also adequate."

BERNHEIM, A. R. Calcium Need and Calcium Utilization. J.A.M.A. 100, 13:1001 (Apr. 1), 1933.

**Colds Lead Them All**—A country-wide sample of 8,000 odd families surveyed for a year gave a sickness rate of 850 per 1,000. Many important findings are recorded in this valuable research which confirms in the main the more limited sampling of the Hagerstown studies.

COLLINS, S. D. Causes of Illness in 9,000 Families, Based on Nation-wide Periodic Canvasses 1928-1931. Pub. Health Rep. 48, 12:283 (Mar. 24), 1933.

**Bran as a Source of Fibrous Roughage**—A good word is said for the laxative value of bran by one who was numbered among the doubters. Except in cases of ulcerated or highly irritable colon, the authors feel now that bran is indicated in constipation. In many cases a diet high in green and fibrous vegetables is not sufficient.

COWGILL, G. R. and SULLIVAN, A. J. Further Studies on the Use of Wheat Bran as a Laxative. J.A.M.A. 100, 11:795 (Mar. 18), 1933.

**Group Medical Services Grow**—This month the Welkin rings with discussions of social medicine. This paper is a valuable contribution as a record of successful ventures in group hospitalization and medical practice.

DAVIS, M. M. Organized Action in Medical Care. Survey Graphic 22, 4:207 (Apr.), 1933.

**The Hague's Refuse Disposal**—How the streets are kept clean in that country we think of as the acme of cleanliness is interestingly told. Slovenly American communities will think it an unattainable counsel of perfection.

DEGROOT, V. Street Sanitation in Holland. Municipal San. 4, 3:86 (Mar.), 1933.

**The Decline and Fall of Diphtheria**—The record of deaths from diphtheria in England from 1881 to 1931 is presented, together with case reports, for the edification of those who may care to compare experience here and there. They will derive comfort from the comparisons.

FORBES, J. G. A Survey of Diphtheria in England and Wales. J. State Med. 41, 3:131 (Mar.), 1933.

**Potency of Toxoid Varies**—Apparently all diphtheria toxoid is not equally potent. The author found one product distinctly inferior to four others in a comparative test. This is a subject into which health officials would do well to inquire.

GREENGARD, J. The Effectiveness of Commercial Diphtheria Toxoid in Active Immunization of Infants. J.A.M.A. 100, 11:793 (Mar. 18), 1933.

**Air in Home and School**—The author tells in minute detail how he keeps his residence at a temperature of 62° to 64° F., adding radiant heat to rooms only when, and as, occupied. Over a 10-year period the sickness record of his large family living under these conditions has been good. An interesting contrast between factors in

the adequate ventilation of home and school is presented.

HAYHURST, E. R. Air-Conditioning With Relation to Comfort, Health and Efficiency. *J. Indust. Hyg.* 15, 2:98 (Mar.), 1933.

**Eating for Healthy Teeth—**Another summary of the rôle of diet in preventing decay of the teeth; a story which cannot be too often retold as long as the "clean tooth" fallacy returns to haunt its guilty perpetrators.

LYONS, D. C. Diet and Decay of Teeth. *Am. J. Nurs.* 33, 3:203 (Mar.), 1933.

**Smallpox—Old Style—**What hemorrhagic smallpox can do when it pops up in an unvaccinated community is told in this symposium on a recent Canadian outbreak with 56 recorded cases and 17 deaths—a fatality rate of 30 per cent.

McINTOSH, J. W., *et al.* The Vancouver Outbreak of Hemorrhagic Smallpox. *Canad. Pub. Health J.* 24, 3:105 (Mar.), 1933.

**The Insidious Menace (?) of Public Health to Private Medicine—**The Sage of Baltimore takes a pot-shot at the recommendations of the Committee on Costs of Medical Care in true Menckonian fashion with gratuitous gibes at the reprehensible proclivities of health workers who offer demoralizing social services to all and sundry. Whether you are infuriated or amused, you will find the article good for the soul.

MENCKEN, H. L. What's Going On in the World. *Am. Mercury* 28, 3:257 (Mar.), 1933.

**When Crude Death Rates Lie—**"A man dies of influenzal pneumonia; at autopsy a very early cancer of the kidney is found; this death will be recorded . . . as being caused by cancer." "If diabetes is mentioned, even as a secondary cause . . . diabetes will get the credit." These are two reasons why statistics do not mean what they seem to mean.

MILLER, J. R. Do Official Death Rates for Diabetes, Cancer and the Puerperal State

Accurately Reflect Present Conditions? *New Eng. J. Med.* 208, 9:490 (Mar. 2), 1933.

**Tuberculosis Prevention Surveyed—**This is a general review of the modern developments in tuberculosis control presented to a university group in readily understood words, though it could hardly be designated a popular summary.

MYERS, J. A. Recent Developments in Our Knowledge of Tuberculosis. *Am. Rev. Tuberc.* 27, 2:121 (Feb.), 1933.

**When Do Children Grow?—**Maximum increase in weight occurs in the fall, less in the winter and least in the spring. During 8th and 9th years boys grow a little faster than girls, but in the 10th year girls put on speed until the 14th when boys again forge ahead. Other worth-while observations are recorded.

PALMER, C. E. Seasonal Variation of Average Growth in Weight of Elementary School Children. *Pub. Health Rep.* 48, 9:211 (Mar. 3), 1933.

**Preventable Causes of Maternal Deaths—**This article on what's wrong with maternal hygiene administration has some far reaching implications. For instance, "It is an incontrovertible fact that certain discoverable functional defects render a woman unfit for pregnancy or delivery. . . . To know the danger and to refuse to protect her from it is to practise, not enlightened medicine, but ancient or medieval philosophy, on the altars of which every year certain women are sacrificed." The paper is reprinted in the current issue of the *Medical Officer*, 49, 10 (Mar.), 1933.

ROCK, J. Maternal Mortality. *The Commonwealth (Mass.)* 19, 4:171 (Oct.-Dec.), 1932.

**A Savage Rejoinder to Pasteurization Opponents—**"There is nothing in any of these experiments to indicate that any unknown substance is de-

stroyed by pasteurization. All the results (such as they are) are explainable on a diminution of calcium and phosphorus fed to experimental animals whose need of these substances is much greater than man. They offer no evidence which can be applied to man." The remainder of the paper discussing the practical bearing of pasteurization upon child nutrition appears in the succeeding issue.

SAVAGE, W. G. The Effect of Pasteurization Upon the Nutritive Properties of Milk. *Lancet*, 224, 5713:429 (Feb. 25), 1933.

Potent Arguments Against Socialized Medicine—An effective, convincing presentation of the arguments against the proposals of the Committee on Costs of Medical Care, avoiding all the invective and billingsgate that have marred so much of the discussion by the opponents of the majority schemes. It should be read critically and conscientiously by all health workers.

SCHWITALLA, A. M. Basic Considerations in Minority Report of Committee on Costs of Medical Care. *J.A.M.A.* 100, 12:863 (Mar. 25), 1933.

## BOOKS RECEIVED

HEALTH ORGANIZATION. Enquiry into the Quinine Requirements of Malarial Countries and the World Prevalence of Malaria. League of Nations. Boston: World Peace Foundation, 1932. 89 pp. Price, \$.75.

AMERICAN AND CANADIAN HOSPITALS. Edited by James Clark Fifield. Minneapolis: Midwest Publishers Company, 1933. 1560 pp. Price, \$10.00.

THE COSTS OF MEDICAL CARE. By I. S. Falk, C. Rufus Rorem and Martha D. Ring. Chicago: University of Chicago Press, 1933. 623 pp. Price, \$4.00.

THE INCIDENCE OF ILLNESS AND THE RECEIPT AND COSTS OF MEDICAL CARE AMONG REPRESENTATIVE FAMILIES. By I. S. Falk, Margaret C. Klem, and Nathan Sinai. Chicago: University of Chicago Press, 1933. 327 pp. Price, \$3.00.

THE ABILITY TO PAY FOR MEDICAL CARE. By Louis S. Reed. Chicago: University of Chicago Press, 1933. 107 pp. Price, \$2.00.

MEDICAL BIOLOGY. By William B. Sharp. Galveston: Author, 1933. 443 pp. Price, \$4.50.

IMPROVISED EQUIPMENT IN THE HOME CARE OF THE SICK. 2d ed. By Lyla M. Olson. Philadelphia: Saunders, 1933. 197 pp. Price, \$1.25.

THE RISE OF PREVENTIVE MEDICINE. By Sir George Newman. New York: Oxford Press, 1932. 270 pp. Price, \$3.00.

THE GIRLS' CAMP. By Abbie Graham. New York: Womans Press, 1933. 146 pp. Price, \$1.50.

AMERICAN RED CROSS FIRST AID TEXT-BOOK. Philadelphia: Blakiston, 1933. 237 pp. Price, \$.60 Paper and \$1.00 Cloth.

# NEWS FROM THE FIELD

## SUMMER SCHOOL COURSES IN PUBLIC HEALTH

*While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.*

### *American National Red Cross*

#### Courses in Teacher Training for Home Hygiene Instructors:

- University of California, Los Angeles, Calif.—June 28–August 9
- Colorado Agricultural College, Fort Collins, Colo.—July 10–August 19
- Pennsylvania State College, State College, Pa.—July 3–August 11
- Syracuse University, Syracuse, N. Y.—July 5–August 12

### *The National Society for the Prevention of Blindness*

#### Courses to prepare teachers for the education of children with seriously defective vision:

- University College, University of Chicago, Chicago, Ill.—June 26–August 1
- Teachers College, Columbia University, New York, N. Y.—July 10–August 18
- Western Reserve University, Cleveland, O.—June 19–July 28

### *University of California, Berkeley, Calif.*

June 26–August 4

- Elementary Epidemiology
- Elementary Public Health
- Management of the Hospital Unit
- Supervision in Hospitals and Schools of Nursing

### *University of Chicago, Chicago, Ill.*

June 19–August 25

First Term: June 19–July 21

Second Term: July 24–August 25

- Teaching the Principles and Practices of Nursing

- Supervision in Schools of Nursing
- Ward Management and Teaching
- General Bacteriology
- Advanced Bacteriology, Parasitology, and Public Health
- Special Public Health Problems
- Preventive Medicine and Immunology
- Introduction to Nutrition
- Nutrition
- Clinical Nutrition
- Seminar in Food and Nutrition
- Child Care
- Child Development and Training

### *Columbia University—DeLamar Institute of Public Health, College of Physicians and Surgeons, New York, N. Y.*

June 12–30

- School Health Supervision—Medical Inspection, Mental Hygiene, and Physical Education

### *Teachers College, New York, N. Y.*

July 10–August 18

- Administration of Health Work in Schools
- Child Hygiene
- Health Education in Elementary Schools
- Health Problems in the Teaching of Fresh Air Classes
- Home and Community Hygiene
- Methods of Teaching Lip-Reading
- Nutrition and Health
- Personal Hygiene
- Principles of Public Health Nursing
- Public Health Administration
- Safety Education
- School Nursing
- Sight Saving Classes
- Supervision in Public Health Nursing
- Supervision of Health Education
- Survey of Public Health Nursing

Health Education in Nursing Schools  
 Health Care of Children  
 Principles of Health Education  
 Health Examination  
 Tests and Measurements in Health and Physical Education  
 Administration of Health Education in Public Schools  
 Administration of Health and Physical Education in Teacher Training Institutions

*Cornell University, Ithaca, N. Y.*

July 10–August 18

Gymnastics and Dancing  
 Health Supervision of School Children  
 Hygiene of the School Child and Adolescent  
 Measurements of School Children  
 Physical Education  
 Principles of Health Education

*Duke University, Durham, N. C.*

June 9–July 20, 21–August 31

Materials and Methods in Health Education  
 Materials and Methods of Physical Education  
 Personal and School Hygiene

*University of Georgia, Athens, Ga.*

June 13–August 13.

Child Care and Training  
 Child Study and Parent Education  
 Diagnosis and Treatment of Exceptional Children  
 Educational and Mental Hygiene  
 Physiology and Health  
 Principles of Health and Recreation  
 The Age of Adolescence  
 The Age of Childhood  
 Nursing School Rural Sociology

*University of Hawaii, Honolulu, T. H.*

June 26–August 4

Principles of Health Education and School Hygiene

*University of Illinois, Urbana, Ill.*

June 19–August 12

Physical Education  
 School Program of Physical Education  
 Training Theory  
 Health Education and Corrective Gymnastics  
 Physical Education Program for Elementary Schools  
 Mental Hygiene in the School  
 Methods of Teaching Health  
 Mass Physical Activities

*Johns Hopkins University, Baltimore, Md.*

June 26–August 5

Subject Matter of Health Education—  
 Personal Hygiene  
 Subject Matter of Health Education—  
 Public Hygiene

*Massachusetts Institute of Technology, Cambridge, Mass.*

Bacteriology—July 5–August 11

Health Education Methods—July 5–25

*Michigan State College, East Lansing, Mich.*

June 19–July 28

Bacteriology  
 Health Education Matters  
 Hygiene  
 Medical Biology  
 Pathology  
 Physiology

*University of Michigan, Ann Arbor, Mich.*

June 26–August 4

General Hygiene and Public Health  
 The Mental Hygiene of Adolescence  
 Child Hygiene  
 School Health Problems  
 Methods and Materials in Health Teaching  
 Principles of Public Health Nursing  
 Administration and Organization of Public Health Nursing  
 Applied Nutrition  
 Applied Hygiene and Public Health  
 Public Health Statistics  
 Public Health Law and Administration  
 Rural Hygiene  
 Industrial Hygiene  
 Race Hygiene  
 Epidemiology and Communicable Diseases  
 Public Health Laboratory Methods  
 Public Health Institute

*University of Minnesota, Minneapolis, Minn.*

June 19–July 29

Public Health

*University of Missouri, Columbia, Mo.*

June 12–August 4

Nursing  
 Physical Education  
 School Hygiene



*University of New Mexico, Albuquerque, N. M.*

June 5-July 29

Educational Hygiene

*New York University, New York, N. Y.*

July 7-August 16

Teaching for Health

Child Hygiene

Administration and Supervision of the Health-Education Program

Health and Growth of School Children

*Rutgers University, New Brunswick, N. J.*

June 26-August 4

First Aid

Preventive Medicine

Public Health

*Stanford University, Stanford University, Calif.*

June 23-September 3

Physical Education and Hygiene

*Syracuse University, Syracuse, N. Y.*

July 5-August 11

Public Health Nursing

Methods in Teaching Home Hygiene Courses

*Vassar College, Poughkeepsie, N. Y.*

June 28-August 9

Institute of Euthenics

Child Psychology

Adolescent Psychology

Course for Nursery School Teachers

Mental Hygiene

Physiology and Nutrition

Household Technology

Food Selection, Preparation, and Service

Problems of the Modern Family

Parent Education Leadership

*University of Virginia, University, Va.*

June 20-July 30 (First Term)

August 1-September 3 (Second Term)

Biochemistry

Hygiene and Sanitation

Physical Education

Sex Character Education

*Washington University, St. Louis, Mo.*

June 16-July 28

Sociology and Social Work

Education

Family Health

Psychology

Nursing

Public Speaking

Principles of Public Health Nursing

*University of Washington, Seattle, Wash.*

June 14-July 21 (First Term)

July 24-August 24 (Second Term)

Advanced Nutrition

Bacteriology

Physical Education Methods

Principles of Physical Education

Introduction to Public Health Nursing

Principles of Public Health Nursing

School Hygiene

Supervision in Physical Education

Principles in Health Education

Organization and Administration of Physical Education

*University of West Virginia, Morgantown, W. Va.*

June 12-July 21

Playground and Community Recreation

Public School Health

Principles of Physical Education

Problems in Physical Education

*Western Reserve University, Cleveland, O.*

June 19-July 28

Theory and Practice of Nutrition

Foods

Personal Hygiene

The Teacher's Relation to the Community

Public Health Nursing

Health Education for the Elementary School

Dietetics

*University of Wisconsin, Madison, Wis.*

June 26-August 4

Bacteriology

First Aid to the Injured

Supervision and Administration of School Health

Tests and Measurements in Physical Education

Health Education in Schools

## GERMS NOT KILLED BY LIQUID HELIUM

EXTREMELY low temperatures, approaching those believed to exist in interstellar space, failed to kill bacteria in tests at the University of Toronto. Germs frozen for weeks in liquid helium, at a temperature of about 450 degree below zero Fahrenheit, proved to be alive and able to multiply as though nothing had happened to them, as soon as they were thawed out.

These results are taken as indicating at least the possibility of the lower forms of life migrating through space, perhaps attached to bits of dust. They are of more immediate practical value as demonstrations of the fact that though cold will preserve foodstuffs it will not kill the germs of decay that lurk on them.

The experiments were performed by Dr. J. O. Wilhelm, physicist, Dr. H. Wastenays, biochemist, and Dr. W. L. Holman, bacteriologist.—*Science News Letter*, Feb. 11, 1933.

## HOOKWORM SURVEY

THE examinations in 8 counties in Mississippi have been completed in a hookworm survey carried on by the Mississippi State Board of Health in coöperation with the department of preventive medicine of the Vanderbilt University School of Medicine, and the International Health Division of the Rockefeller Foundation. The survey was begun September 1, 1932. Twenty per cent of the 8,363 specimens examined showed the presence of hookworm ova. Of those found positive, there was an average of 135 worms per person. Thus far, the results of the survey indicate that intensive parasites are a problem of only the white race, the report stated. Negroes showed less than 2 per cent positive for hookworm ova.—*J.A.M.A.*, Mar. 11, 1933, p. 748.

## PERSONALS

DR. ELDRED V. THIEHOFF, a member of the A.P.H.A., has been appointed Acting Director of the Cleveland Child Health Association in the absence of Dr. Richard A. Bolt, who has been granted an award by the Oberlaender Trust for a year's study abroad. Dr. Thiehoff was formerly Chief of the Child Hygiene Service of the Akron City Health Department.

DR. R. E. DYER, of the U.S.P.H.S., was chosen by the Association of Military Surgeons of the United States to deliver the lecture at the Kober Day celebration in Washington, March 28. His subject was "Typhus and Rocky Mountain Spotted Fever."

DR. DANIEL M. BRADLEY, of Waycross, Ga., has been elected Commissioner of Health of Ware County.

DR. WEBB CONN, of Brunswick, Ga., has been elected Health Commissioner of Glynn County.

DR. JAMES ANGUS DOULL, F.A.P.H.A., of the Western Reserve University School of Medicine, Cleveland, sailed March 25 for the Philippine Islands to organize an epidemiologic study for the eradication of leprosy.

DR. SAMUEL MCC. HAMILL, of Philadelphia, member A.P.H.A., has been appointed by Governor Pinchot to the office of Chairman of the Pennsylvania Emergency Child Health Committee to supplement the work of relief organizations, with special emphasis on nutrition.

DR. CHARLES A. NEAFIE, member A.P.H.A., of Pontiac, Mich., has been appointed associate director of health of the State of Maine. Dr. Hubert M. Heitsch, F.A.P.H.A., succeeds Dr. Neafie as director of the Pontiac Health Department, it is reported.

- DR. EUGENE P. KING, second deputy superintendent of health of Providence, R. I., has announced his retirement. Dr. King has been connected with the department for over 40 years.
- DR. W. T. HENSHAW, F.A.P.H.A., of Charleston, has resigned as State Health Commissioner of West Virginia.
- DR. DAVID LITTLEJOHN, F.A.P.H.A., of Charleston, has been appointed as Acting Health Commissioner of West Virginia, in place of Dr. W. T. Henshaw, resigned.
- DR. HUGH C. McREE, for years head of the Morgan County Health Unit, has been appointed Health Officer of Lee County, with headquarters at Opelika, Ala.
- DR. GEORGE L. THOMPSON, of Owensboro, Ky., member A.P.H.A., has resigned as Health Director of Daviess County and is now Health Officer of McLean County. Dr. Lawrence Hubert Medley was elected to succeed him in Daviess County.
- DR. GEORGE HERBERT RAMSEY, F.A.P.H.A., of the Johns Hopkins School of Hygiene and Public Health, Baltimore, has been appointed Director of the Division of Communicable Diseases of the New York State Department of Health.
- DR. HAROLD JACKSON DAVIS, member A.P.H.A., Epidemiologist of the New York State Department of Health, has been appointed director of medical care for the Temporary Emergency Relief Association.
- DR. CHARLES N. DENISON, member A.P.H.A., has been appointed Health Officer of New Hartford, Conn., succeeding Dr. John R. Lee. Dr. Wilbur J. Moore succeeds Dr. Denison as Health Officer of Cheshire.
- DR. JAMES W. BASS, of Dallas, member A.P.H.A., was elected president of the Texas Public Health Association at the recent meeting in Dallas.
- DR. THEODORE SNYPP, of Auburn, Calif., succeeds Dr. David M. Kindopp as Health Officer of Placer County, Calif.
- DR. CHARLES C. DUBOIS, formerly Health Officer of Warsaw, Ind., was elected Mayor recently.
- DR. WILLIAM W. MCFARLAND, member A.P.H.A., has been appointed Director of Health of Pittsburgh, to succeed the late Dr. Charles B. Maits, F.A.P.H.A.
- DR. THOMAS C. LYNCH, of Wichita Falls, was recently appointed Health Officer of Wichita County, Tex.
- DR. WALTER L. BIERING, of Des Moines, Ia., has been appointed State Health Commissioner of Iowa, effective July 1.

## DEATHS

CLARENCE A. SHORE, M.D., F.A.P.H.A., of Raleigh, N. C., died on February 10, 1933. For 25 years Dr. Shore was Director of the Division of Laboratories of the North Carolina State Board of Health. He was a native of Winston-Salem, N. C., and a graduate of the University of North Carolina. He received his medical degree from Hopkins in 1907. He built a first-class laboratory, which has rendered invaluable service to the people of his state. In 1929 he was awarded the Doctor of Science degree from the State University as a recognition of his important service in the promotion of scientific progress. He has been a member of the A.P.H.A. since 1909, and a Fellow since 1923.

DR. CHARLES O. PROBST, of Columbus, Ohio, superintendent of the Franklin County Tuberculosis Sanatorium, died on April 2, at the age of 75. He

was secretary of the American Public Health Association for more than 10 years, and was also a former president of the Association. He became a member of the A.P.H.A. in 1886 and a Fellow in 1926.

RENÉ VALLERY-RADOT died on January 24, 1933, at the Hospital of the Pasteur Institute. He was the President of the Council of Administration of the Pasteur Institute of Paris. He is best known to us as a historian and biographer of Pasteur. He was the son-in-law of Pasteur, having married his daughter, Marie-Louise. Apart from his biography, he had a high reputation as a writer, having had special training from his father in this line. He had also made a place for himself as a diplomat.—*Ann. de l'Inst. Pasteur*, Feb., 1933.

DR. L. C. HAVENS, Director of Laboratories of the Alabama State Health Department since 1921, died after a heart attack at his home on March 19, 1933. He was born at Lebanon, N. H., in 1891. He studied at the University of Colorado and Harvard University and was Assistant Professor of Immunology in the School of Hygiene at Johns Hopkins University before coming to Alabama. Dr. Havens has been a member since 1920 and a very active Fellow of the Laboratory Section of the A.P.H.A. since 1931; and has presented papers at our meetings dealing with methods of isolating typhoid bacilli, a subject in which he was an outstanding authority. At the time of his death he was a member of the Committee on Standard Methods.

JAMES R. MCCLINTOCK of the firm of Fuller & McClintock, died on April 11, of a heart attack following an illness of several weeks with influenza and bronchitis. He was educated at the University of Rochester and the

Massachusetts Institute of Technology from which he was graduated in 1906. His entire professional career was spent with Hering & Fuller, the firm of George W. Fuller and the firm of Fuller & McClintock, which was organized in 1916. Mr. McClintock was a member of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Consulting Engineers, American Water Works Association, and the American Public Health Association.

## CONFERENCES

April 29–May 6, National Boys' Week.

May 1—May Day—Child Health Day.

May 29–31, Western Branch, A.P.H.A., Pasadena, Calif.

June 5–6, State and Provincial Health Authorities of North America, Washington, D. C.

June 5–6, State and Territorial Health Officers Conference, Washington, D. C.

June 11–17, National Conference of Social Work, Detroit, Mich.

June 12–17, American Medical Association, Milwaukee, Wis.

June 20–24, Seventh Health Education Conference, Ann Arbor, Mich.

June 26–30, National Tuberculosis Association, Toronto, Canada.

June 26–30, Annual Meeting of the American Home Economics Association, Milwaukee, Wis.

June 27–July 1, Convention of the Association for Childhood Education, Denver, Colo.

June 28–July 3, International Hospital Congress, Knocke-sur-Mer, Belgium.

July 1–7, National Education Association, Chicago.

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

June, 1933

Number 6

## Obstacles in the No-Diphtheria Path\*

W. P. SHEPARD, M.D., F.A.P.H.A.

*Assistant Secretary, Welfare Division, Pacific Coast Head Office, Metropolitan Life Insurance Company, San Francisco, Calif.*

IF tomorrow should give us a positive means of preventing cancer, how would we proceed to tell the public about it? The effectiveness of our method would determine to a large extent the number of lives saved. Ineffective methods would mean continuation of the cancer tragedy.

On the day after the increase in postal rates took effect, the San Francisco Post Office reported that over 10 per cent of letters received had insufficient postage. This was in spite of a carefully conducted program of education by the United States Post Office Department. It took 200 smallpox deaths in 1924 to get the people of Los Angeles reasonably well vaccinated, despite repeated warnings from a generation of health officials. The *New Yorker* states that following an advertising campaign by a tooth paste concern featuring pink tooth brush as a sign of pyorrhea, one drug store had 300 customers try to buy a pink tooth brush! A health officer may well ask,

"When will people learn, and, how do they learn?"

During the last 15 years, we have sought many practical answers to this question in our efforts to eradicate diphtheria. Compared with smallpox vaccination, which was violently opposed for much more than 15 years, our method is greatly improved. Perhaps omission of compulsion early associated with smallpox vaccination accounts for this in part.<sup>1</sup> Be this as it may, diphtheria eradication is far from an accomplished fact, especially in western United States. With all due credit for our success, perhaps a study of our failures will prepare us to do a better job in the future when we are called upon to inform the public of a new discovery and are obliged to use our ingenuity to persuade people to do what we tell them.

### WESTERN DIPHTHERIA IMMUNIZATION STATUS

With a view to estimating both successes and failures in the anti-diphtheria campaign in the West, a study was undertaken late in 1930, to ascertain by a sampling method how many children of susceptible age had been immunized in

\* Read before the Health Officers Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

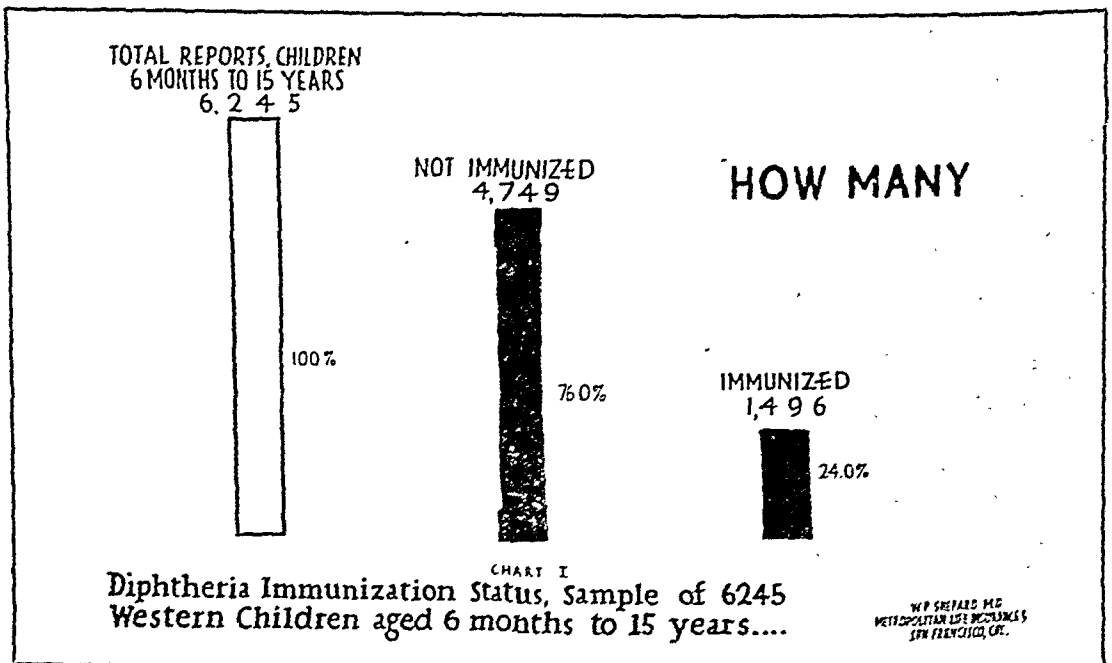
various western localities, by whom they had been immunized, and, finally, the reasons why a considerable proportion remained unprotected.

With the approval of the Manager of the Pacific Coast Head Office and the Welfare Division of the Home Office of the Metropolitan Life Insurance Company, the agents in various localities, from Denver west, and Seattle south, were asked to conduct a diphtheria immunization census. Blanks were furnished for this purpose, on which the agent was to list the name and address of the family contacted, the number of children in the family with their ages, the number immunized, by whom immunized, and reason given by the householder why the unprotected children had not been immunized. Agents were instructed to interview both policyholders and non-policyholders in a given block within a designated 2-week period, obtain the

centers. Their immunization status is illustrated in Chart I. This chart shows that of 6,245 children, 1,496, or 24 per cent, had been immunized, while 4,749, or 76 per cent, were not. There was, of course, considerable variation from city to city.

Of the 1,496 immunized, 1,266 reported "by whom" immunized. Among these 760, or 60 per cent, had been treated in the school clinics; 333, or 26.3 per cent, by private physicians; 168, or 13.3 per cent, by other public clinics; 5, or 0.4 per cent, by the industrial physician (Chart II).

The 4,749 children who were reported not immunized included 1,958 families from whom satisfactorily completed answers to the question, "Why not?" were obtained. Among the reasons given, a total of 76 different phrases, many of them meaning the same thing, were used. It was found that these 76 phrases could be divided

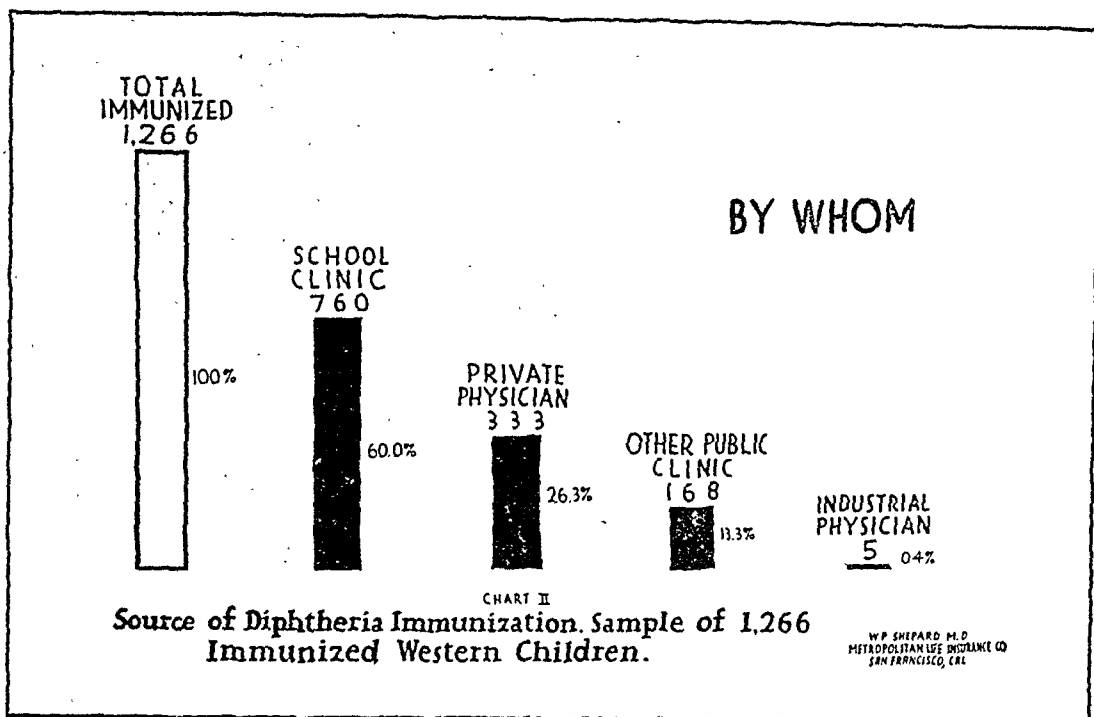


data requested, and return the reports to the head office. Satisfactorily completed blanks were eventually obtained for 6,245 children between the ages 6 months and 15 years, scattered throughout the West, largely in urban

somewhat arbitrarily into 5 main classes, as follows:

**Lethargy:** Including such reasons as "neglected," "may later," "too much trouble," "overlooked," "not convenient," etc.

**Ignorance:** Including such reasons as "never



knew of it," "not exposed," "not convinced," "had diphtheria," "not of school age," etc.

*Opposition:* Including such reasons as "opposed," "don't want," "religious objections," "made friends ill," "previous unsatisfactory experience," etc.

*Economic:* Including such reasons as "can't afford," "not offered free," "will if free clinic available," etc.

*Legitimate Medical:* Including such reasons as "illness," "negative Schick," "doctor advised against," etc.

In making this arbitrary classification the border-line between causes attributable to lethargy and ignorance was not always clear; nor the line between economic objection and other opposition. However, the difference between active opposition, from whatever cause, and psychic indolence was usually clear. It is, of course, realized that the reasons given to agents may not always have been true ones, but at least the error in each case is reasonably comparable. It is believed that these reasons shed some light on the ineffectiveness of certain diphtheria immunization programs.

When thus classified, it was found that 979 or 50 per cent of the reasons

could be attributed to lethargy; 406 or 20.7 per cent to ignorance; 424 or 21.7 per cent to opposition; 131 or 6.7 per cent to economic reasons; 18 or 0.9 per cent to legitimate medical reasons (Chart III).

It will be noted that ignorance and lethargy account for 70.7 per cent of the failures of these families to have their children protected. Certainly, these causes of failure are a challenge to the health worker. If we could inform our public of the value of diphtheria protection, and do it in precisely the right way, over two-thirds of our failures could be abolished.

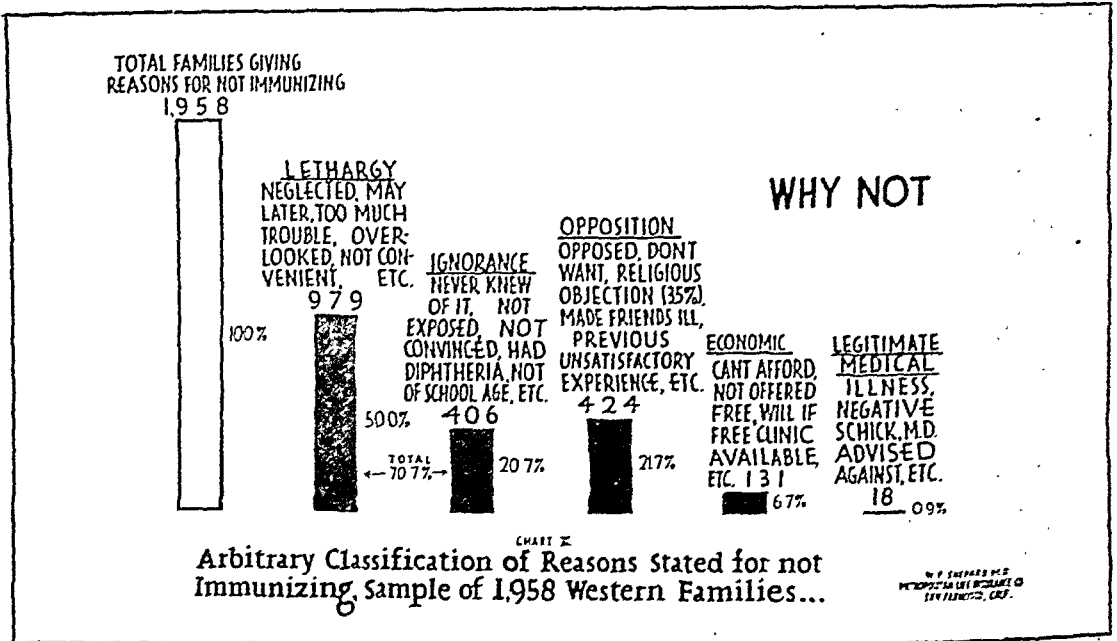
As to the 22 per cent showing active opposition, certainly many could be won over. Only 3.5 per cent of the total admitted objection on religious grounds. Although this may be a deceptive figure, experience teaches that even religious objections can sometimes be overcome when properly approached. Possibly this surprisingly high percentage of opposition is due to the prevalence of cultism in the West, especially in Southern California. This large percentage of opposition also

brings up the question of whether our attempts to educate the public are resulting in a certain degree of negativism. It may be that something in our method is so objectionable as to lose rather than gain certain recruits to our cause.

the hope that we can improve our methods.

#### LIMITATION OF MASS SELLING

Diphtheria immunization, like many other portions of the health information program, is at least in part a sales job.



Certainly the economic objection amounting to 6.7 per cent is within the province of most health organizations to remedy. The legitimate medical objections give us no cause for concern.

These proportions are not dissimilar to a study made by the Oklahoma State Health Department covering 892 failures to immunize.<sup>2</sup>

#### COMMENT

It would seem that there is room for improvement in our present method of informing and activating the public in the matter of diphtheria protection, at least in the West, and it is assumed that we are not unique in this regard. It appears that there are peculiarities of public receptiveness which we do not always appreciate. It is incumbent upon us as health informants to examine these peculiarities with care in

Sales experts agree that so-called "mass selling" is the quickest and most economical way of reaching the public. One wonders if we have not been misled by this philosophy. So much of our health propaganda, including diphtheria information, constitutes a broadside aimed at the public in general. Much of this broadside must fall on deaf ears.

It is common procedure, for instance, in promoting an anti-diphtheria campaign, to make extensive use of newspapers, radio broadcasts, placards, billboards, street car signs, etc. When we come to analyze the actual number in the group we are attempting to motivate, it seems questionable whether this method is so effective after all.

For instance, San Francisco has a population of 634,394.<sup>3</sup> Of this number, 33,860 are over 65 years of age, few of whom would be responsible for



children between the ages of 6 months and 15 years; 119,308 are single men who are obviously not interested; 65,311 are single women; 159,056 are minors, under 21 years of age, in whom we are not directly interested. Since our chief concern in the matter of diphtheria immunization is to reach parents with children between the ages of 6 months and 15 years, we can deduct these childless persons, 377,535, from the total population, leaving a balance of 256,859 persons in this city who are married and under the age of 65. This number includes many childless couples so that the number of individuals whom we desire to reach is probably not over 225,000. Now, it is not usually necessary to convince both parents of the importance of diphtheria immunization. As a rule, if we reach either the mother or father effectively, the job is done. It will be seen that there are not many more than 120,000, about 20 per cent of the population, whom we wish to inform and motivate. And yet we issue a broadside aimed at 634,394!

The illustration can be made even more impressive if we bear in mind that the diphtheria problem is really solved if we can but immunize 70 to 80 per cent of all children at the age of 1 year and continue this for 10 years. In San Francisco there are only 5,816 children under 1. This means immunizing an average per month of only 484! Forty nurses need make personal calls on only about 3 per week apiece.

In a recent health education campaign, worked out with unusual care, in New York City under the supervision of Commissioner Wynne, parents were furnished through their school children with "teasers" offering further information on various aspects of healthful living. They were asked to fill out a card with their names and addresses and check the items in which they were particularly interested. It is reported that about 2 per cent responded.<sup>4</sup> Even

this is considered satisfactory, since most advertisers are elated when they obtain 1 per cent response in matters of this kind. One per cent or 2 per cent response to our anti-diphtheria propaganda is disappointing, to say the least.

To be sure, there is a certain charm in widespread newspaper articles, and especially in street car placards and billboard signs. To those of us who are responsible for designing and placing these signs, they are gratifying, and make us feel that we are really doing something. Perhaps this is a form of self-hypnotism which we must not allow to mislead us. Such methods undoubtedly have some value as a miscellaneous background, but cannot replace the personal appeal.

#### INDIVIDUAL VS. MASS SELLING

We find in current public health practice some noteworthy examples of the effectiveness of individual selling as opposed to mass selling. It is more expensive, but at the same time is less extensive. The visit of the public health nurse and social worker to the home of the known case of tuberculosis has proved extremely effective. Most of our infant and maternal hygiene program has been limited by its very nature to a selected group, among whom individual selling is effectively done. For obvious reasons, we do not attempt to use newspaper articles, billboards, and street car placards to urge the expectant mother to report to a given clinic. The real effectiveness of quarantine depends upon individual instruction by the health officer's deputy or the public health nurse, rather than upon passing ordinances and police notification. The powerful health education influence of bedside nursing has been felt throughout the country. Even in the notable diphtheria experience of Vaughan<sup>5</sup> in Detroit, most effective results were obtained both with the

public and with the physician when personal contact was made.

#### SOME FACTORS INFLUENCING PUBLIC RECEPTIVENESS

Five years ago we had the benefit of an excellent symposium on "Steps in Planning a Health Education and Publicity Program."<sup>6</sup> Unfortunately, it was not presented to the Health Officers Section. The concluding paragraph of Winslow's paper in this symposium is worth reviewing:

The object of our whole program is, I take it, to change the conduct of individual men, women and children. . . . We are interpreters between the vast resources of health and science on the one hand and the individual in the home and factory on the other. We must keep both things in view. We must believe in both. We must have faith in the message we deliver. As Richard Cabot once said, I think, of social service, "We must feel that we have something 'too hot to hold.'" We must also believe in the educability of the common man, or our efforts will be spiritless and futile. It is these two faiths after all—faith in the cause and faith in human nature—which make the health educator. Whatever our technic, whatever our rigidity of self-criticism, we must add at the end that quality of enthusiasm—a word which in its derivative sense means an inward God. The work of translating the lessons of science into human conduct is indeed a godlike one. If we fully realize its significance, we shall not fail.<sup>7</sup>

Professor Franklin Fearing<sup>8</sup> pointed out some of the fundamental psychological reactions among which we must operate when informing the public about health: that whether we like it or not, people have what are called "attitudes" concerning health and other matters, which may be characterized as follows:

They tend always to express themselves in actions, to have a strong emotional coloring. They do not involve rational processes as an antecedent to action. They may be conscious or unconscious. They are associated with and

easily released by symbols, signs, slogans, phrases, catch words, and pictures. Where fundamental attitudes are involved, the response is out of proportion to the intensity of the stimulus. They may be developed as a result of a single experience or they may be established by systematic and persistent propaganda.

#### PUBLIC HEALTH ATTITUDES AND SYMBOLS

What are the attitudes toward health matters of this 22 per cent who indicated active opposition to diphtheria immunization? What are the attitudes of the 70 per cent who indicated lethargy or ignorance? Many of them must be unfavorable. How much have we done to create these unfavorable attitudes? How much have we done intelligently to overcome them? It is safe to say that the symbol associated with the attitude in the minds of many of these people is probably a painful looking hypodermic syringe, or a disagreeable red quarantine sign, or perhaps a disagreeable odor of disinfectants and guinea pigs, or perhaps a stern visaged health department nurse, or a hard-boiled sanitary inspector, or even a policeman who once called at their house in connection with health department matters. Perhaps their attitude to the health department is merely impassive and so feeble that it cannot express itself in action.

It would seem that we lack effective symbols in public health which could activate proper attitudes. Thus a symbol which means so much to us who know its history may mean to the general public the senseless strapping of a helpless child to an uncomfortable looking board with enough bandages around its body to make it look like an Egyptian mummy. Even the caduceus, so eloquent and satisfactory to physicians, may mean nothing but two

snakes wound around a stick to the public.

On the other side of the picture there is the Red Cross, an international symbol of succor and mercy. There is the health center, coming to mean as it has in recent years an attractive building with pleasing architecture, a touch of landscaping, attractive furnishings, and cordial, polite attendants. There is the almost universal earnestness of the average health officer and other health worker as he or she stands before an audience, pleading the cause of health. These and many others which could be cited are productive of correct attitudes and helpful symbols in the public mind. Our job is to search for more of them.

Galdston<sup>9</sup> has pointed out that we are in error when we assume that the public mind can be likened to an empty vessel standing upon a shelf waiting to be filled with knowledge. He points out that the human mind is dynamic, not static; and our task is more like that of the batter who attempts to strike a moving baseball than of the billiard player who strikes at a still ball. He calls attention to the fact, however, that the public mind, like the baseball, will usually follow a given direction and a limited number of curves. It is these directions and curves which we must study in order to make a hit.

#### SUCCESSFUL ANTI-DIPHTHERIA MEASURES

Applying this to our diphtheria problem, space will permit but a few specific illustrations of the procedures which are likely to be successful.

Not many years ago, a remarkably successful anti-diphtheria campaign was conducted in New York City. One of the most effective things done was to obtain a highly decorated and beautifully printed letter from the Catholic Archbishop which exhorted his

parishioners to avail themselves of this protection for their children. This is recalled because we often fail to obtain the support of religious advisers, whom some people will follow more quickly than anyone else.

The testimonial method of advertising, regardless of the furor it has caused in scientific circles, has back of it a deliberate and well planned attempt to take advantage of known psychological principles.<sup>10</sup> One of the first things attempted by those who made a survey of health education in the Philippine Islands recently, when it was decided that the prevalence of beri beri could best be controlled by persuading the public to eat unpolished rice, was to obtain a photograph of the Governor General of the Islands eating unpolished rice.<sup>11</sup> This would seem a most legitimate use of the testimonial method of mass selling, and one wonders why it has not been used more frequently in health promotion.

It would be comparatively simple to obtain photographs of the children of prominent citizens being immunized. Advertisers have found that persons of prominence are rather open to the argument that what they do, to some extent at least, sets the pattern for what others will do in their locality.<sup>12, 13, 14</sup> Certainly there should be much less difficulty with this argument when used in favor of a plan which will save life than would be the case when used in connection with a plan to sell more of a certain cold cream. It might even prove cheaper to the health officer than to the advertiser.

The now well established practice in many health departments of sending letters, urging diphtheria immunization, to the parents of 1-year old children is an effective measure which illustrates the value of individual selling. When this letter is followed by a visit from a nurse, it is still more effective.

### UNSUCCESSFUL ANTI-DIPHTHERIA MEASURES

Procedures which seem less likely to be successful are use of the fear motive, the imperative and official tone often used on health department consent slips, extended public controversy with the "antis" and exclusive reliance upon mass selling which tends to annoy those not concerned. Possibly these are mistakes which account for some of our active opposition.

### SUMMARY

To summarize, every activity undertaken to promote an anti-diphtheria campaign should be carefully scrutinized to eliminate objectionable methods through which we may be unwittingly repelling potential supporters. The more individual selling we can do, rather than mass selling, the more effective will be our work. The audience to whom we would appeal is often much smaller than we think; therefore, the cost of individual approach is not so great as might be feared. In estimating the speed, curve, and direction of the ball we wish to hit, we must take account of the known principles of psychology by developing new attitudes and furnishing favorable symbols and stereotypes.

### CONCLUSIONS

1. In a sample of 6,245 western children investigated by the agents of a life insurance

company only 24 per cent had been immunized against diphtheria.

2. Of the 1,496 already immunized 60 per cent were treated at school clinics, 26.3 per cent by private physicians, 13.3 per cent at other public clinics, 0.4 per cent by the industrial physician.

3. Of the 1,958 families giving reasons for failure to immunize, 70 per cent might be attributed to lethargy or ignorance, 21.7 per cent to active opposition, 6.7 per cent to economic reasons, and 0.9 per cent to legitimate medical reasons.

4. The underlying causes of failure of parents to immunize their children are discussed and suggestions made for remedy.

### REFERENCES

1. Stern, Bernhard J. *Should We Be Vaccinated?* Harper & Bros., 1927.
2. True, MaBelle. *Why Parents Delay, Hygiea*, Nov., 1931, p. 1034.
3. *U. S. Census Reports, 1930*, Government Printing Office, Washington, D. C.
4. Personal Communication.
5. Geib, L. O., and Vaughan, H. F. *The Physician as a Health Worker, J.A.M.A.*, 97, 6:367 (Aug. 8), 1931.
6. Routzahn, M. S. *Steps in Planning a Health Education and Publicity Program, A.J.P.H.*, XIX, 5:513 (May), 1929.
7. Winslow, C.-E. A. *The Facts—How to Decide What is to be Told, A.J.P.H.*, XIX, 6:650 (June), 1929.
8. Fearing, Franklin. *The Approach—How to Decide on the Motives for Conduct to Which an Appeal Will be Made, loc. cit.*, p. 654.
9. Galdston, Iago. *The Psychophysics of Health Education, Trans. 28th Annual Meeting National Tuberculosis Assn.* (In Press.)
10. Galdston, Iago. *Hazards of Commercial Health Advertisements, A.J.P.H.*, XXI, 3:242 (Mar.), 1931.
11. Personal Communication.
- 12, 13, 14. Johnston, Alva. *Testimonials C.O.D., Outlook*, 157:398-9 (Mar. 18), 1931.
- Testimonials Wholesale, *loc. cit.* (Mar. 25), 1931. pp. 434-6.
- Testimonials F.O.B., *loc. cit.* (Apr. 1), 1931, p. 466-7.

# Relation of the Use of Milk to the Physical and Scholastic Progress of Undernourished School Children<sup>\*</sup>

FRED F. LININGER, PH.D.

*The Pennsylvania State College, State College, Pa.*

THE essential place of milk in the human diet is now generally recognized, primarily, it may be noted, because of extensive experimentation with the lower animals. For self evident humanitarian reasons, long-time experiments which involve the placing of large numbers of persons on a milk-free diet are seldom conducted. Basic scientific experimentation upon children by Sherman and Hawley,<sup>1</sup> however, was cited 10 years ago in an editorial, which reads in part<sup>2</sup>:

The dietary rule of a quart of milk each day for every child is much more than a precept based on individual opinions or drawn by analogy from the results of feeding experiments with lower animals; it now rests on scientific evidence obtained by extensive and intensive experiment directly upon the children themselves.

Further evidence may be obtained by studying the records of progress made by children in those centers where under existing conditions some children receive no milk, and others receive it in varying amounts. This paper, which is a progress report, presents data on the relation of the use of milk to the physical progress of pupils enrolled in special health classes conducted by the Division of Medical Inspection in the Philadelphia public schools over a

2-year period; also some information, rather meager, on the parallel that may be found in the scholastic progress of the same groups. In these classes were enrolled pupils who were 13 per cent or more underweight according to the Baldwin-Wood standards of age, height, and weight. It is a statistical analysis based on the records of gains in weight compiled by school nurses and of scholastic gains reported by teachers. Gain in weight was the only available statistical measure of physical progress. For the 1930-1931 school year there were 2,522 individual records and for 1931-1932, 1,611. Included in the 4,133 records were 931 "free milk cases"—pupils who receive  $\frac{1}{2}$  pint of free milk daily in school. The milk consumption of the other pupils ranged from 0 to more than 1 quart daily.

## VALIDITY OF DATA AND DESCRIPTION OF SPECIAL HEALTH CLASSES

The special health classes were organized not to obtain experimental evidence, but to promote the health of a large number of undernourished pupils, and the use of milk was only one of many practices followed to achieve this end. An extensive health record was available for each child showing age, apparent financial status of the family, quality of home food, presence of physical defects such as diseased

<sup>\*</sup> Publication authorized by the Director of the Pennsylvania Agricultural Experiment Station, Jan. 19, 1933, as *Technical Paper No. 579*.

TABLE I

RELATION OF THE USE OF MILK TO GAINS IN WEIGHT OF UNDERNOURISHED PUPILS  
Health Instruction Group, Division of Medical Inspection, Philadelphia  
Public Schools—1930-1931 and 1931-1932 School Years

<i>Milk Consumption Practice</i>	<i>Number of Pupils</i>	<i>Average Semester Gain per Pupil</i>		<i>Probable Error of Mean Gain in Pounds</i>
		<i>Pounds</i>	<i>Per cent*</i>	
I No Milk	268	2.73	100	.09
II All Milk Users	3,865	3.53	129	.03
(a) Free Milk in School	931	3.40	125	.05
(b) Milk at School—No Record of Home Use	440	3.39	124	.07
(c) Milk at Home—No Record of School Use	1,893	3.50	128	.04
(d) Milk at Home and at School	601	3.95	145	.05

\* Taking 2.73 lb. as a basis for comparison

sils, dental caries, defective vision, nasal obstructions, characteristics of the child's rest period, and the like.

The nurses (approximately 90) who compiled the records, in addition to the regular training required of graduate nurses, received special instruction in nutrition. They were, with few exceptions, experienced workers who had been compiling similar records since 1926. By frequent visits to the homes, they were thoroughly familiar with conditions and food consumption practices.

A brief description of the special health class work is quoted<sup>2</sup>:

There were 163 such health classes conducted by the nurses, the majority of the nurses succeeding in their attempt to conduct one health class in the fall term and one in the spring term. This plan allows only 4 to 5 months in the health class for each child, although children in the fall classes who fail to gain are often continued as members of the spring health classes.

The gain in weight in the fall months is characteristic. Part of it is real, due to the natural tendency to take on fat during cold weather, with lessened outdoor activity and earlier retiring hours. Part of it may be only apparent, due to heavier underclothing donned with the advent of cold weather. If there is a small error to our apparent advantage during the fall months, at least it may be remarked that the same error in the spring months, due to the discarding of the heavier clothing, correspondingly works to lessen the record of gains in weight, so that the figures

for the whole year are thus balanced and may be taken as accurate.

#### USE OF MILK AND PHYSICAL PROGRESS

The 4,133 individual records were sorted into 5 groups, based on differences in milk consumption of the pupils as recorded by the nurses. Actual quantities of milk consumed were not obtainable, except for 425 pupils in the 1931-1932 study. In 1930-1931 the average gain of those using milk at home and at school was 29 per cent greater, and in 1931-1932, 84 per cent greater than of those using no milk. Increased gains were associated with the use of milk consistently in both semesters of each year.

Combining data for the 2 years, the average gain per pupil in the group receiving no milk was 2.73 lb. per semester (Table I). When the 3,865 users of milk in varying amounts and from varying sources were grouped, the average gain per pupil was 3.53 lb. per semester, or 29 per cent greater than that of those not using milk. The pupils using milk at home and at school during the 2 years gained 45 per cent more than those not using milk.

For a large number of pupils, records were not obtainable for either the home use or the school use of milk. In group II-b, classed as "Milk at school,

no record of home use," the average gain per pupil was 24 per cent greater than in the "No milk" group. Likely, a rather small proportion of group II-b received no milk at home. On the other hand, doubtless, a large proportion of the group classed as "Milk at home, no record of school use" received no milk at school; the average gain per pupil, however, was 28 per cent greater than in the "No milk" group. The records suggest that the use of milk in the home was more closely related to gain than was the use of the milk in school.

These data were in accord with the results of similar research in Scotland<sup>4</sup> where milk was furnished as a supplementary food to children in school. In the Scottish experiment, the milk group in 1927 (1,282 elementary school children) gained 21.62 per cent more than the non-milk group; and in 1928 (1,157 children) the milk group gained 45.37 per cent more than the non-milk group.

*Age and Gain in Weight*—Again in 1930, reporting on an investigation of 20,000 children, 5 to 12 years of age, inclusive, in Lanarkshire schools, Scotland, Leighton, and McKinlay<sup>5</sup> concluded:

The influence of the addition of milk to the diet of school children is reflected in a definite increase in the rate of growth, both in height and weight.

There is no obvious or constant difference in this respect between boys and girls, and there is little evidence of definite relation between the age of the children and the amount of improvement. The results do not support the belief that the younger derived more benefit than the older children. As manifested merely by growth in weight and height the increase found in younger children through the addition of milk to the usual diet is certainly not greater than, and is probably not even as great as, that found in older children.

It is recognized, however, that the normal gains of adolescent children are larger than those of younger children of school age. In the present analysis of

gains in weight among undernourished children the rule holds (Table II). Those of adolescent age, 12 to 15 years, made greater gains than those under 12 years of age. The differences in gains of undernourished children under 12 years of age, however, were not significant, and confirm the conclusions of Leighton and McKinlay relative to children of this age.

TABLE II

AVERAGE GAINS IN WEIGHT OF UNDERNOURISHED PUPILS BY AGE, HEALTH INSTRUCTION GROUP, DIVISION OF MEDICAL INSPECTION, PHILADELPHIA PUBLIC SCHOOLS—1930-1931 AND 1931-1932 SCHOOL YEARS

Age	Number of Pupils *	Average Semester Gain in Weight per Pupil Pounds
6	8	2.26
7	73	2.85
8	350	2.92
9	740	3.27
10	730	3.39
11	488	3.62
12	335	4.05
13	227	4.54
14	102	4.33
15	83	3.82
16 and over	66	2.58
	3,202	3.54

\* 931 "free milk" cases are not included

In order to note the possible influence of age on gains in weight of the several milk consumption groups, the age distributions of each group were determined. It was found that 30 per cent of the pupils in the "No milk" group (Table I) ranged from 12 to 15 years inclusive, while only 19 per cent of those in the group receiving milk at home and at school were of similar age. Therefore, those who used milk made greater gains than those who did not, not because they were older but despite the fact that they were younger.

For 425 pupils in the 1931-1932 school year, data relative to approxi-

mate quantities of milk consumed daily, rather than merely the milk-consuming practices, were separately analyzed. One hundred eighty-four pupils who received 1 quart or more of milk daily made an average semester-gain of 4.34 lb. per pupil, compared with 3.98 lb. per pupil for 241 children who received less than 1 quart daily. The difference in gains of the two groups, approximately 9 per cent, is in itself not highly significant, but in this comparison also the large users of milk were younger pupils than those using less than a quart. Only 19 per cent of those who used 1 quart or more daily were from 12 to 15 years of age, but 29 per cent of those using less than 1 quart daily were in this age group.

*Physical Defects and Gain in Weight*—An analysis of the records sorted and sub-sorted on the basis of the presence or absence of diseased tonsils, dental caries, defective vision, and nasal obstructions, revealed no significant differences in gains in weight during the semester in which the defects were corrected. Hence, the presence of varying proportions of these physical defects in the milk groups could not account for variations in the gains found in the different groups based on milk consumption.

*Family Finances and Gain in Weight*—The financial status of the family, good, fair, or poor, as reported by the nurses showed no significant relationship to gains in weight. The average semester gain per pupil for children from families with good incomes was only 0.18 lb. greater than that for children from families with poor incomes.

In both years covered by the investigation relatively more children from families with low incomes received no milk than children from families with moderate or high incomes, and conversely, a smaller proportion of children from families with low incomes received

milk at home and at school than children from families with moderate or high incomes.

*Home Food and Gain in Weight*—Further analysis of the records suggest that the use of what is generally recognized to be sufficient milk is more essential for children in families with low incomes having poor food than for children in families with favorable incomes having adequate food. In the well-to-do families where plenty of food of variety is available the addition of milk may contribute less to a well balanced diet than it does to the diet of families in economic stress.

A suggested relation of the adequacy of home food to gains when the Sherman standard of not less than 1 quart of milk daily is observed, is shown in Table III. The differences in gains were found to be too small relatively to the probable errors to be regarded as highly significant, but the consistent results of the various groups appear reasonable. In the vertical comparison in this table, with "Sufficient milk" the gains were 8 per cent greater when home food was rated by the nurses as "good," rather than "poor"; with "Insufficient milk," however, the increased gain with good instead of poor food was much greater, 19 per cent. It appears that good food was more important when pupils received insufficient milk.

Likewise, sufficient milk was more essential when children had otherwise poor home food. In the horizontal comparison in Table III, with poor food those getting sufficient milk gained 20 per cent more (4.09 lb. compared with 3.40 lb.) than those getting insufficient milk, while with good food those with sufficient milk gained only 9 per cent more (4.41 lb. compared with 4.06 lb.).

*Home Rest Period and Gain in Weight*—Pupils reported to have good rest periods at home daily made



TABLE III

GAINS IN WEIGHT MADE BY 425 UNDERNOURISHED PUPILS WHO USED DIFFERENT AMOUNTS OF MILK WHEN OTHER FOODS WERE CLASSED AS GOOD, FAIR AND POOR  
Health Instruction Groups, Division of Medical Inspection,  
Philadelphia Public Schools—1931-1932

<i>Home Food</i>	<i>Gains in Weight When Each Pupil Used Less Than One Quart of Milk Daily— "Insufficient Milk"</i>		<i>One Quart of Milk or More Daily— "Sufficient Milk"</i>	
	<i>Pounds</i>	<i>Per Cent *</i>	<i>Pounds</i>	<i>Per Cent †</i>
Poor	3.40	100	4.09	100
Fair	4.02	118	4.26	104
Good	4.06	119	4.41	103

\* Taking 3.40 lb. as a basis for comparison

† Taking 4.09 lb. as a basis for comparison

greater gains than those having poor rest periods. When the milk drinking factor was held constant by sub-sorting, it was found that of the 440 children in the group classed as "Milk at school, no record of home use," 157 children had a fairly satisfactory rest period and gained 4.04 lb. per semester compared with a gain of only 3.02 lb. made by the 283 children whose rest period was reported as unsatisfactory.\* This is a significantly greater gain and argues for an adequate rest period at home.

Finally, it has been the aim of this section of the paper not to discuss the relative merits of the weighing of school children as an index of nutrition or to establish the thesis that the use of milk causes increased gains in weight, but rather to show that gains in the weights of the undernourished children whose records were studied were positively associated with the use of milk in the diet. It is recognized that gain in weight may be an inadequate index of progress toward normal nutrition and that a cause-effect relationship cannot be proved by statistics. The writer is

in agreement with Whitney, who writes<sup>6</sup>:

We know that growth depends on many factors. We cannot separate these scientifically and specify exactly the factor that is responsible for each separate unit of growth. Therefore, to teach children that there will be an increase in weight or height immediately following increased consumption of milk is misleading and creates by its exaggeration a false idea in the child's mind. Yet it is valuable for children to realize that milk is an important food in the diet of growing children, and this true idea can be given children effectively without leading them to expect results which no one can guarantee.

#### USE OF MILK AND SCHOLASTIC PROGRESS

Reports of the scholastic progress of a majority of the pupils enrolled in the special health instruction classes were obtained from the teachers. The relative merits of the combined judgment of teachers in comparison with objective tests is not within the scope of this paper. There is here presented only a brief statement of the relationships of the use of milk and scholastic progress as disclosed by existing records. It is not conclusive, but indicative of existing tendencies.

For the 2-year period, 45 per cent of the pupils receiving milk were shown to have improved in scholarship, while improvement was recorded in only 24

\* All the sub-sorts on the basis of the use of milk showed similar results. Approximately the same proportion of pupils having unsatisfactory rest periods were found in each milk-use group, and therefore this factor did not change the relationships between the various milk groups.

per cent of the cases in which milk was not used. It is of interest to note that a higher percentage (56) of those who received milk at school were reported to have improved in scholarship than was found for the other groups.

These observations relative to the use of milk and scholastic progress parallel results in the studies made under the direction of the Scottish Board of Health<sup>4</sup> when milk was given as a supplementary food in school. Editorial comment on the Scottish report reads<sup>7</sup>:

The improvement in the general health was such that the groups of children receiving milk could be picked out merely by inspection. The good effects of adding milk to the diet were, indeed, even more obvious in the period covered by this second report than they were in the previous period, and it was significant that the improvement was mental as well as physical. Dr. C. A. Douglas says that "general alertness was common to all the children fed on milk."

There is much evidence of the association of physical fitness and scholastic progress. Cornell has presented statistical evidence covering work in 4 schools<sup>8</sup> showing:

In each school, and in each individual branch of study in each school, the healthy or normal children stood higher in their classes than the average children, and the physical defectives, taken as a class, stood lower than the average children.

Scientific evidence supports the conclusion that a well developed, disease-free, and properly nourished body

furnishes the most favorable environment for the highest development of the natural mental equipment. While one's maximum mental capacity may not be actually increased, the existing mental equipment may be made to function more satisfactorily when physical handicaps are removed and the body is properly nourished.

#### REFERENCES

1. Sherman, H. C. and Hawley, E. Calcium and Phosphorus Metabolism in Childhood. *J. Biol. Chem.*, 53:375 (Aug.), 1922.
2. Milk Calcium for Children. *J.A.M.A.*, 79:968 (Sept. 16), 1922.
3. Cornell, Walter S. Director, Division of Medical Inspection of Public Schools. Report for the Year Ended June 30, 1930. The Board of Public Education and the Department of Public Health, Philadelphia, Pa.
4. Leighton, Gerald and Clark, Mabel L. Milk Consumption and the Growth of School Children. *Lancet* 216:40 (Jan. 5), 1929.
5. Leighton, Gerald and McKinlay, Peter L. *Milk Consumption and the Growth of School Children*. Dept. of Health for Scotland. His Majesty's Stationery Office, 120 George Street, Edinburgh, Scotland. 1930.
6. Whitney, Anne. The Weighing and Measuring of School Children. *Child Health Bull.*, 6:43 (Mar.), 1930.
7. The Virtues of Milk. *Lancet* 216:28 (Jan. 5), 1929.
8. Cornell, Walter S. *Health and Medical Inspection of School Children*, F. A. Davis Company, Philadelphia, Pa., 1912.

**ACKNOWLEDGMENT:** The writer desires to acknowledge the valuable assistance of Dr. Walter S. Cornell, Director, and Dr. Dorothy Child, Assistant Director, Division of Medical Inspection, Philadelphia Public Schools, Philadelphia, Pa., through whose coöperation the records of the Division were made available for study, and the report was prepared for publication.

# Fumigation of Foodstuffs\*

## Public Health Aspects of an Increasing Commercial Practice

C. L. WILLIAMS, M.D.

*Senior Surgeon, U. S. Public Health Service, Rosebank, Staten Island, N. Y.*

THE fumigation of foodstuffs has reached proportions that render it imperative that we take specific notice of its effect on the public health. Available data do not permit of precise statements, but from figures furnished by manufacturers of fumigants it is estimated that during the year 1931 there were fumigated in the United States 700,000,000 cu. ft. of building space (mostly warehouses, flour mills, etc., containing foods), 500,000,000 lb. of commodities (mostly foods, in fumigation chambers), 4,000 ships (many of them loaded), and 7,000 railway freight cars (loaded and empty). These figures are conservative. The practice is growing, so that it is believed the figures for 1932, when compiled, will be larger by from 10 to 25 per cent.

*Purposes of Fumigation*—Except for the destruction of rats on ships, there is hardly any direct or specific public health purpose involved in fumigation. It is employed almost exclusively to destroy vermin that for one reason or another constitute an economic loss; largely, this is the destruction of various insects infesting foods.

*Fumigation Processes*—There are two principal processes: (1) fumigation at atmospheric pressure, (2) in a vacuum chamber.

The vacuum process insures penetra-

tion of the fumigant into practically any package that can be put into the apparatus; the treated material may absorb as much as 80 per cent or 90 per cent of the gas. When fumigation is at atmospheric pressure, much smaller proportions are taken up, while penetration into different types of materials varies greatly and requires much longer time.

*Materials Used*—There are quite a number of fumigants used in commercial practice, but only a few to any considerable extent, these being hydrocyanic acid, cyanogen chloride, sulphur dioxide, carbon bisulphide, ethylene oxide, ethylene dichloride, and chloropicrin. All of these are gases at ordinary temperatures or are converted to gases by simple evaporation; all are poisonous, in some degree, to all forms of animal life; all are absorbed to some extent by the materials fumigated. Continued aeration will remove the greater part of the absorbed gases, but there is considerable variation as to the time required.

The varying toxicity and speed of action of these gases is reflected in the varying concentrations and periods of exposure employed. In commercial practice, these factors tend to balance one another, the more toxic and quickly acting materials being used in smaller amounts and for shorter periods.

*Absorbed Gas*—The hazard peculiar to the treatment of foodstuffs is the

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

absorption of gas in the fumigated material. This has been known for years, but the subsequent effect on consumers has never been completely and authoritatively determined. While hydrocyanic acid, because of its high toxicity, naturally has attracted attention, other fumigants have not been so closely studied. The thought has appeared that if HCN may be safely used, other materials of lesser toxicity are harmless. This may not be true; other gases must be used in heavier concentrations, and their mechanism of poisoning is different.

Absorption of fumigants is dependent on quite a number of factors, the most important being the process, concentration of gas, length of exposure, temperature, and the presence of moisture. Fats absorb larger amounts of those that are fat solvents. Porosity increases the speed of absorption. All of these also affect the rate of subsequent dissipation.

Three things may happen to gas absorbed in foodstuffs: the gas may be retained in its original form; it may be given off when the food is removed into fresh air; or it may become chemically combined with the ingredients of the food. As regards the first and second possibilities, the status at any one moment is a matter of time. When fumigated foods are removed into the open air, the absorbed material immediately starts to pass into the air and eventually all that is in a free state will be so dissipated. While it has been noted in some cases that the fumigant combines with certain foods, hydrocyanic acid with levulose and ethylene oxide with water being demonstrated instances, the data at hand indicate that in practice this occurs only to a quite limited extent.

*Absorption Studies*—The problem of absorbed fumigants has been studied principally by chemical methods. Studies have usually been carried out

by exposing samples of foods to varying amounts of the fumigant for varying periods, and determining at intervals thereafter the amounts of gas remaining in portions of the sample. This method would have supplied us long ago with a definite answer to the problem were it not for the failure to determine whether the fumigant found in fumigated foods was actually poisonous when consumed. In the few instances where such tests were made, no poisoning could be detected. Most of these are concerned with foods that actually absorbed or retained relatively small proportions of the fumigant.

*Absorption Hazards*—The fumigant absorbed in foodstuffs may become a hazard in two ways. If stored in a closed space, evolution of the absorbed gas may produce a lethal or toxic concentration in the air of the storage chamber. This is a danger that is often given entirely too little thought, though it is far more real than the other hazard, that is, poisoning of consumers by retained gas. So far as published data go, there have been a number of fatalities from gas released from fumigated materials, but there is no instance on record, of which the writer is aware, of any human being ever having been killed by eating fumigated food.

The absence from the literature of any report of death from consuming fumigated foods is remarkable and deserves particular emphasis. Quite a number of writers have given their attention to this subject; so there has been no lack of search. The only reasonable conclusion is that no such deaths have occurred.

Evolution of gas in storage is a hazard that is not peculiar to foods and so will not be further considered here.

The presence of any considerable amount of absorbed fumigant can be detected by smell or taste, particularly (due to evolution of the gas) the former. Trained fumigators find the

sense of smell a reliable test, the practical experience of years bearing out the belief that when the odor of a fumigant has disappeared, the amount still retained is small.

*Hydrocyanic Acid*—Because hydrocyanic acid is the fumigant that has given rise to the most concern, it is advisable to discuss it in more detail.

The effect of hydrocyanic acid fumigation on foodstuffs was recently investigated and the data at hand reviewed by Monier-Williams<sup>1</sup> for the International Commission on Fumigation of Ships, sponsored by the League of Nations and the Office International d'Hygiène Publique.

Largely because of the lack of data as to actual poisoning by absorbed HCN, Monier-Williams was quite conservative in drawing conclusions as to the permissible content in foods. The Commission, in its report,<sup>2</sup> was equally conservative, stating that 20 p.p.m. HCN in food probably does not affect the health of the consumer. As a matter of fact, considerably larger amounts than this have undoubtedly been consumed on numerous occasions without any effect whatever being noted.

The German and French regulations permit the importation of Rangoon beans containing as much as 300 p.p.m. of HCN. These regulations, however, take into consideration the fact that the beans are cooked before consumption.

For many years, it has been a common practice for fumigators to eat food immediately after fumigation; in fact, on ships, the writer has known fumigators (protected by gas masks) to go into compartments under fumigation and bring out food to be immediately consumed. In such cases, however, the concentration of gas used was not high—seldom over 0.2 volume per cent of HCN. However, Moore<sup>3</sup> reports instances of fumigators consuming candies and nut-meats fumigated in a much

higher HCN concentration—1 volume per cent—within a few minutes of their removal from the fumigation chamber, without any signs of poisoning being noted. The writer has frequently eaten fumigated foods within a few minutes of their removal from the gas, and has noted that in the dry foods such as crackers there was no taste of HCN, but that sometimes in fruits such as grapes and apples the gas could be detected, presumably more through odor than taste. Fruits that were eaten after peeling showed no signs of gas.

The relatively few animal tests have all been negative. Some years ago, the U. S. Public Health Service<sup>4</sup> fumigated bread and milk with gas concentrations up to 0.4 volume per cent, and fed it to mice—in some instances immediately after fumigation, and in others after a period of airing. The conclusions were that in no cases were the mice affected by eating the food, but in some instances when placed in jars with unaired fumigated food, they were killed by breathing the gas evolved.

Swanson and Working<sup>5</sup> cite experiments wherein fumigated grain was fed chickens. In nearly all of these cases, the grain contained about 20 p.p.m. of HCN and was fed to the test animals over periods of several days to 2 or 3 weeks. In no instance could any poisonous effect be noted. Bittenberg and Weiss<sup>6</sup> fed fumigated foods containing from 10 to 30 p.p.m. of HCN to men in place of their regular diet, over periods up to 1 week, without noticeable effect. Lutrario<sup>7</sup> fed fumigated food containing 20 to 100 p.p.m. of HCN to dogs, in approximately 500 gm. portions, without effect. Other instances might be cited, but they are all of the same order.

As against these data we have a considerable volume of chemical determinations which have shown that the amount of HCN absorbed varies very considerably. In some instances, im-

mediately after fumigation as much as 2,000 p.p.m. were found. While this was exceptional, it has not been unusual to find as much as 100 or even 200 p.p.m.

More than 100 p.p.m. appear practically only in foods fumigated by the vacuum process or, at atmospheric pressure, with concentration of the gas greater than the usual limit of 1 volume per cent. In the former case, it is usual commercial practice to air-wash, in the vacuum chamber, goods designed for shipment within a short period. When fumigated foods are cooked prior to being eaten, retained hydrocyanic acid is reduced to a negligible figure, the high temperature causing it to be rapidly dissipated.

The fatal dose of hydrocyanic acid is generally placed at 60 mg. It will be seen, therefore, that when a food contains 100 p.p.m., it would be necessary to consume 600 gm. of it to ingest a fatal dose of the poison. This amount is a rather large portion of any one food.

Hydrocyanic acid inhibits the consumption of oxygen by the tissue cells. The poison is in part removed by conversion in the body into less toxic substances and in part by elimination, most rapidly through the lungs. Its inhibitory action on oxygen consumption depends largely on the concentration present, so that toxic action is measured by the balance between the rates of absorption on one side and of chemical change and elimination on the other. It will be appreciated, therefore, that poisoning by way of the stomach is dependent more on the rate of absorption than on the total amount of HCN ingested. An amount, poisonous when taken in concentrated form, might be totally innocuous when mixed with a large quantity of food. Furthermore, if the food contains sugars, a still larger amount of HCN may be taken with it, it having been shown that

sugars eaten with or shortly before consumption of HCN definitely reduce its poisoning effect.

According to data at present at hand, only small amounts of HCN are fixed in foods by combination with levulose, hence, its removal from fumigated foods is relatively complete if sufficient airing is permitted. As a rule, 24 hours' ventilation gives a safe margin. The potential menace is the factor of the time between completion of the fumigation and consumption of the food. Consideration of this factor at once removes certain fumigations altogether from the dangerous list. Prominent among these are fumigations of grain in storage, of flour mills, and of practically all foodstuffs at the place of manufacture.

When we go to fumigations of foods at the point of sale, however, the time interval before consumption is much shorter. For example, the fumigation of a grocery store on a Sunday may be followed by sale of some of the stock next morning.

A still shorter interval would occur when a dwelling is fumigated without removal of the household food stores and a meal is prepared from these immediately after the family is readmitted to the premises. While it would appear, from some chemical determinations, that such practice might be dangerous, no instances of actual poisoning have been reported.

*Ethylene Oxide*—During the past few years, ethylene oxide has come into considerable favor as a fumigant for foodstuffs. Being necessarily used in much heavier concentration than HCN, more of it is absorbed, but this increase is balanced by its much lower toxicity.

Ethylene oxide is stated to have a narcotic action. It is known to be locally irritant to the stomach and lungs, and probably to other tissues. In the presence of water it forms, at

ordinary temperatures, a limited amount of ethylene glycol, which in the body is in part oxidized to oxalic acid, a well known poison. As in the case of HCN, however, it has been clearly shown that the minimum poisonous dose is in excess of the amount retained in foods, either as the unchanged gas or as ethylene glycol. In the first place, the retention of about 5,000 p.p.m. would be necessary to include a poisonous dose in a 500-gm. portion of food, while to be poisoned by the ethylene glycol that might be formed, a man, on the basis of any reasonable computation,<sup>8</sup> would have to consume some hundred pounds of the fumigated food at one sitting. According to Schwartz and Deckert,<sup>9</sup> 90 per cent of absorbed ethylene oxide is removed by 24 hours' aeration.

*Other Fumigants*—What has been stated with regard to hydrocyanic acid and ethylene oxide applies in general to the absorption and subsequent health menace of other fumigating gases. Space does not permit an account of all of the fumigants mentioned, but it may be stated for all fumigants now in general use that there exist no specific data to support any contention that these absorbed in fumigated materials are a menace to consumers. While the volume of fumigation of foodstuffs is high, report of morbidity or mortality from the consumption of fumigated foods to date is zero.

*New Fumigants*—In view of the statement just made, it is well here to sound a warning. Chemical progress is constantly supplying us with new compounds, and it is to be expected that new fumigants will appear from time to time. What changes they may produce when used to fumigate foodstuffs can be determined in each instance only by careful investigation, which should always precede their introduction into general use.

*Moist Foods*—Chemical study has shown that many of the fumigants,

notably hydrocyanic acid, are absorbed in considerable amounts by water. In consequence, it is not advisable to fumigate moist or liquid foods that would be consumed shortly thereafter. For example, in the fumigation of a restaurant, it is wise to remove all milk, milk products, butter, and any other liquid or quite moist food that would likely be consumed shortly after fumigation, particularly foods that would not first be heated.

*Chronic or Cumulative Poisoning*—The possibility of chronic or cumulative poisoning from the frequent ingestion of foods in which small amounts of fumigant gases may be retained has not been stressed—(1) because there are very few data at hand relative to the possibility of its occurrence, and, (2) because the proportion of foods at present fumigated is too small to render it at all likely that any one would receive fumigated foods at frequent intervals. We may come to the day when most of our foods will be fumigated, by which time it is quite likely that this question will have been answered.

#### CONCLUSION

While one prefers to base definite statements on careful scientific determinations, yet it is not proper that we ignore practical experience when it all points in the same direction and its volume is sufficient to cover adequately variable circumstances. Fumigation of foods has been practiced for a generation. The aggregate volume of fumigated foods is large; yet no one has pointed to a single instance of death or even illness among the consumers. It would seem, therefore, to be a safe conclusion that fumigation of foodstuffs does not constitute a public health menace.

So convincing is the large volume of negative evidence that the Surgeon General of the Public Health Service felt

justified, in 1930, in stating: "This Bureau is not acquainted with any evidence of harm to human beings from the use of food products that have been treated by the cyanide method. . . . It seems that the experience of many years, covering the use of this material, furnishes us with better evidence of harmlessness than would be secured by much experimental work."

While there is not the same volume of data as regards other fumigants, all to date point to a similar conclusion.

As a control of foodstuff fumigation, there would appear to be but one regulation reasonably justifiable—that after fumigation, foodstuffs, before consumption, sale or shipment, should be ventilated not less than 24 hours and until the fumigant is no longer detectable by taste or smell.

## REFERENCES

1. Monier-Williams, G. W. The effect on foods of fumigation with hydrogen cyanide. *Rep. on Pub. Health and Med. Subjects, No. 69*, Ministry of Health, Whitehall, London.
2. Commission on Fumigation of Ships. Report, *Quart. Bull.*, Health Organization of the League of Nations, June, 1932.
3. Moore, William. *Report on the use of hydrocyanic acid in fumigation of foodstuffs*. American Cyanamid Company, New York.
4. Absorption of HCN by foodstuffs. *Pub. Health Rep.*, July 2, 1920.
5. Swanson, C. O., and Working, E. B. *The Miller's Review*, Aug. 1926.
6. Bittenberg, P., and Weiss, H. Effect of fumigation with hydrocyanic acid gas upon food on ships and in warehouses. *Ztschr. f. Untersuch. d. Nahrungs- u. Genussmittel*, xlviii, 1924, p. 104. (*Bull. Office Internat. d'Hyg. Pub.*, 1925, p. 1035.)
7. Lutrario, A. Experiments with hydrocyanic acid. *Bull. Office Internat. d'Hyg. Pub.*, 1921, p. 367.
8. Hanzlik, P. J., Seidenfeld, M. A., and Johnson, C. C. General properties, irritant and toxic actions of ethylene glycol. *J. Pharmacol. Exper. Therap.*, xlii, 4:387 (April), 1931.
9. Schwartz, L., and Deckert, W. The hygienic evaluation of T-gas (ethylene oxide) as a means of fighting pests. *Ztschr. f. Desinfekt. u. Gesundheitswesen*, July, 1930, Hamburg.

## Maternal and Child Health Work Under Social Insurance in France

A RECENT report on the working of the French social insurance law of 1930 points out the health work for mothers and children performed under that law. The insured woman and the non-insured wife and children of the insured man receive in case of illness medical attendance either at home or in an institution. Financial assistance is given to the insured woman when she is in need of preventive treatment and able to do only part-time work. Complete physical examinations are provided free of charge at certain intervals to all insured persons.

The insured women and wives of insured men are entitled to free medical attendance during pregnancy and for 6 months after the birth of the child. The insurance fund also pays a certain part of the expenses incidental to childbirth, or 6 weeks before and 6 weeks

after childbirth the insured woman receives a daily cash benefit on condition that she abstain from paid employment. A nursing benefit is also paid to her for 9 months. The women in receipt of benefits are required to present themselves and their babies at the health centers at certain intervals. They are also visited by public health nurses.

The insurance organizations are permitted by law to give a part of their reserves to various health agencies, such as health centers for mothers and children, maternity homes, sanitariums, rest homes, clinics, and others, or to establish such agencies themselves. In a large number of cities the insurance organizations which do not have their own health agencies have made arrangements with other such agencies for the care of their mothers and children.—*Paris Médical*, March 18, 1933.



# Precaution When Filing Deferred Certificates\*

STEWART G. THOMPSON, D.P.H., F.A.P.H.A.

*Director Bureau of Vital Statistics, State Board of Health, Jacksonville, Fla.*

AMONG the problems facing us today, there is a series of irregularities in connection with the filing of deferred certificates. Efforts to put on file a false date of birth have been repeated in so many instances that it has caused at least one of our government officials to apply the term "racket" to the systematic, well planned efforts to evade the requirements of law. The value and importance of a birth certificate have been so widely accepted that it is difficult to realize that a channel is left open for falsifying records in cases where considerable time has elapsed between the date of birth and the filing of the certificate, enabling the interested party to claim citizenship, government compensation, inheritance rights, etc., to which he is not entitled. States authorizing the acceptance of birth records many years after the date of birth are assuming a grave responsibility and, unless each individual case is carefully safeguarded against the many known forms of irregular testimony, there will be a tendency to blight the cause of registration and lower the standard of the regular records.

It is not just a theory that there is danger of fraud in connection with the filing of deferred certificates. For example, one doctor in particular signed a birth certificate for a birth which he did

not attend. When this was discovered, his explanation was that he did not attend the birth but that the certificate was signed as an accommodation to the patient. Attempts have been made fraudulently to change the names on birth certificates. Investigation revealed in one instance that the certificate in question had been filed properly but that an individual from a foreign country, wishing admittance into the United States, endeavored to use the certificate as his own by having his name inserted. This would not only cause the falsification of a legal record but would, in addition, ruin and obliterate a true and correct certificate which might at a later time be required. Another case which has come to light is that of an old midwife who signed three birth certificates, swearing to attendance and to the fact and date of birth. The immigration officials found the records to be false and, of course, deported the individuals who were in this country endeavoring to use the fraudulent records. The problem under discussion affects more keenly the states having new laws. After a few years of registration, when certified copies as evidence are required more often, its importance is realized. Then, individuals born prior to the enactment of the law make efforts to have their births recorded and the registrar's troubles begin.

In filing a certificate to be used in applying for a passport, there is very often carelessness or lack of true in-

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

formation as to the exact date of birth, which results in a false record. Later, this same record may be needed when an inheritance proof is desired and, though the record could be used in securing a passport, it will not serve in connection with the inheritance. Carelessness in tracing down exact information very often results disastrously to those affected.

In Florida, there is a Junior Baseball League where birth certificates have been required in connection with the eligibility of certain players. Bringing up the subject of a baseball league may sound rather light or trivial but is of vast importance when its effect on the registration system is considered. The organization to which reference has just been made first attempted to prove eligibility of players through affidavits of parents made to the manager or official of the league. So many false affidavits were presented that the association finally decided to require certified copies of birth certificates from the State Board of Health. In one particular case, a birth certificate which was filed, sworn to and signed by two American citizens, was branded as a fraud by the league officials as they claimed to have proof that the young man in question had had his certificate dated one year later than his actual birth date in order that he might play that year with the team. It is not necessary to cite other cases, as those in charge of registration are familiar with the many irregularities.

The problem under discussion is not a new one by any means and, due to the fact that the number of certificates coming under the head of "deferred" is small as compared to the number of regular certificates, it appears to have been kept in the background. The custodian of the records in many instances promulgates rulings or laws to meet circumstances as they come to his attention.

Some individuals feel that if a birth certificate is not filed at the time of birth, it is just a misfortune of the applicant. However, to some of us, this seems rather heartless and severe. Very often, unusual circumstances may account for the failure to file a birth certificate at the time of birth. In one case, which came to the writer's attention recently, the attending physician had a severe attack of appendicitis and died a day or two after delivering the baby; in another case, the doctor intentionally neglected to file a birth certificate because he did not receive his fee for medical services. In such instances, should the child in later years be denied a record giving him his birthrights in the United States?

A questionnaire was sent out recently in an effort to learn the procedures now in effect in the various states for filing of deferred certificates. The information compiled from these questionnaires is very interesting. A reply was received from every state. Of these 48 states, only 20 have laws specifying certain requirements for the filing of deferred certificates. Twenty-eight states have rules or regulations but no statutes. One state in the latter group refuses to file certificates for births prior to 1906, and another will not accept a birth certificate for a person born before 1914.

A further study of these questionnaires reveals that the procedures in establishing the date of birth after a lapse of years are not uniform and that the records under discussion will be safeguarded to a much greater extent if the knowledge and experience gleaned from all states is incorporated into a model section of law. In most states, it is found that rules and regulations promulgated by a state board of health are not binding in some courts, if more authority is taken than was specifically stated in the statute. Therefore, it appears to be inadequate for a

state board of health to pass a rule or regulation on a matter as important as the one under discussion.

For the benefit of those states which have no law governing the filing of deferred certificates and for those states where the custodians may feel that their law is not sufficient, it would seem appropriate for this Section to formulate a model law governing the filing of deferred certificates which would include the experiences of every state and safeguard the records against every irregularity so far discovered.

It is as bad, if not worse, to file a deferred certificate which does not state the true facts as not to file a certificate at all. Therefore, the law governing the procedures should be of such construction as to bring out the true facts before a permanent record is made. The experiences and laws of all of the states might be crystallized into a model statute providing for the filing of deferred certificates by incorporating the following provisions:

1. An application form which is quite comprehensive should be filed by the applicant, this form to embrace every item included in a standard birth certificate. In addition, this form should provide for the name of the person who is to sign the affidavit; the relation of the applicant to the child; the history of other brothers or sisters, giving their names, dates of birth, and places of birth. The more comprehensive the application, the more accurately the birth certificate may be prepared. For instance, if the applicant gives as his date of birth one which conflicts with the date of birth of a brother or sister, the error can immediately be discovered. The application should be carefully prepared and, if necessary, returned to the applicant until every questionable detail has been adjusted, such as the ages of the father and mother which should be given as of the date of birth of the child, etc.

2. The birth certificate then should be prepared for signatures by the state bureau of vital statistics where the most experience in this class of work is available.

3. The birth certificate and affidavit having been completed should then be given to the applicant for the signature of the indi-

vidual who is to sign the affidavit attached to or incorporated in the certificate.

4. If the individual who is to swear to the fact and date of birth resides in the United States, the affidavit should be executed before the highest officer in the court of records or his duly authorized deputy; such officer or deputy being instructed to take whatever testimony is necessary to satisfy him that the individual appearing before him knows the facts before affixing his signature or taking oath.

5. In cases where the signer resides outside of the United States, the affidavit supporting the certificate should be executed by the United States Consul.

6. The applicant should then return the certificate, supported by the affidavit described, to the state bureau of vital statistics, where the file date and signature of the state registrar or director are affixed.

The court of records in each division of a state is undoubtedly the most reliable place for the execution of affidavits of this nature and the taking of any necessary additional testimony. Notaries public, justices of the peace, and other like officers, being more numerous, constitute a greater risk.

In Florida, it has been proved definitely that notaries public in certain specific instances have been deplorably at fault. In one instance, the affiant whose name was signed to the affidavit was a thousand miles away from the county and state where the notary public executed the affidavit and affixed his seal. We had previous information that the affiant lived in the middle west. Upon questioning, the notary public admitted having signed the name of the affiant and further, that the affiant knew nothing whatever of his name having been used in connection with the case. Another outstanding case was one in which a notary public complained that the American Consul of a foreign country had defaced or nullified a certified copy of a birth certificate issued by the State Board of Health. This notary public had been instrumental in placing on file the original certificate which was needed by

an individual who wished to gain admittance into the United States. The American Consul General reported his findings to the Secretary of State, Washington, D. C., to whom the matter had been referred, as follows:

The complaints primarily concern the alleged mutilation or nullification of the birth certificates offered by \_\_\_\_\_ and \_\_\_\_\_ in support of their applications for passports as American citizens, which applications were refused by the Department. . . . It appears that the Vice Consul, in view of the testimony, endorsed the certificates in such a way as would prevent their use for the purpose of obtaining American passports in any other American Consulate. While this endorsement nullified their use for passport purposes, their legal value in the United States was not lessened. It may be stated that the births of these two individuals were apparently registered over twenty years after the alleged births of the two applicants. . . . The result of this office's investigation, confirmed by the judgment of the Department, led to the refusal of passports and to the conclusion that birth certificates, when the births were recorded years after the event by persons interested in securing the admission of relatives into the United States, could only be regarded as presumptive evidence of American births. It is logical to suppose that the Board of Health of Florida, not having these two men before it personally, relied upon the sworn statement of their sister.

Without in any way wishing to cast doubt upon the authenticity of any certificates issued by the Board of Health of Florida, it is submitted that this office, having had the two men before it in person and having examined them, was in a better position to form an opinion regarding their alleged American births than was the Board of Health.

A representative from Washington who handled this case stated that he had 6 Secret Service officers under his direction who made investigations whenever there was any question of the authenticity of birth certificates presented. He added that birth certificates, not only from Florida but also from other states, were turned down from time to time. Verbally, this official stated that there is a "racket" in a certain district involving notaries public, midwives, and a group of people who sign birth certificates for individuals who were not born in the United States.

In preparing a model statute governing the filing of deferred certificates, it is, therefore, of paramount importance that provision be made for thorough investigation as well as sufficient testimony to be taken by a court officer before a certificate is filed.

## MEMBERS AND FELLOWS *of the* A.P.H.A. WHY PAY ANNUAL DUES?

IF you dislike the bother of paying membership or Fellowship dues each year, or  
IF you are one of those absent-minded people who have to be reminded again and again of unpaid dues,

ABOVE ALL IF you are thrifty » « *then you should apply for*  
**LIFE MEMBERSHIP in the A.P.H.A.**

Write to the Committee on Fellowship and Membership of the American Public Health Association for information regarding this form of membership.

# Milk-Borne Disease in Massachusetts 1930-1932\*

GEORGE H. BIGELOW, M.D., F.A.P.H.A., AND  
ROY F. FEEMSTER, M.D., DR.P.H.

*Commissioner, Massachusetts Department of Public Health; and  
Assistant Director, Division of Communicable Diseases, Boston, Mass.*

PREVIOUS chronological reports of milk-borne disease in Massachusetts have been published covering varying periods, the last<sup>1</sup> in 1930. During the past 3 years there has been considerable improvement in the regulations regarding the safeguarding of milk and a diminution in the number of cases of disease traced to milk, and, what is perhaps even more significant, a decrease in the number of cases per outbreak, demonstrating that the larger

## CHANGES IN CONSUMPTION AND CONTROL

In order to learn the changes which have occurred in the consumption and the sanitary control of milk, questionnaires were sent to 122 Massachusetts cities and towns of over 5,000, which represent over 90 per cent of the population of the state. Replies were received from 100 communities, 10 of which did not give sufficient information to be included in the tabulations.

TABLE I  
INFORMATION RELATIVE TO COMMUNITIES ANSWERING QUESTIONNAIRE

Group	Communities in Group	No. of Communities Answering Questionnaire	Per Cent Answering Questionnaire	Population of Group Answering Questionnaire (a)
50,000 and over (I)	17	17	100.0	2,287,713
25,000-50,000 (II)	13	13	100.0	535,990
15,000-25,000 (III)	24	17	70.9	343,150
10,000-15,000 (IV)	20	17	85.0	209,188
5,000-10,000 (V)	48	26	54.2	187,559
	122	90	73.8 (b)	3,563,598

(a) Estimated 1931 population: 4,275,966.

(b) Means in this and all subsequent tables are weighted.

supplies are well protected and it is mainly the small supplies, delivered raw, which continue to spread milk-borne disease.

The 90 giving satisfactory figures (Table I) represent 83.4 per cent of the total population of the state.

The per capita consumption of milk given in previous reports and in the present report are shown in Table II. The figures for the various groups were

\* Sixth Chronological Report from the Massachusetts Department of Public Health.

TABLE II  
PER CAPITA DAILY CONSUMPTION OF MILK IN QUARTS \*

Group	1919	1923	1926	1928	1931
50,000 and over (I)	....	0.46	0.52	0.47	0.45
25,000-50,000 (II)	....	0.50	0.50	0.44	0.38
15,000-25,000 (III)	....	0.38	0.36	0.41	0.48
10,000-15,000 (IV)	....	0.38	0.43	0.36	0.39
Total	0.56	0.46	0.50	0.45	0.44
5,000-10,000 (V)	.... †	....	....	0.38	0.40
Total				0.45	0.44

\* This figure is obtained by dividing the number of quarts of milk sold daily by the total population of the group.

† Questionnaires were not sent to this group until 1928.

not published in 1919 and Group V was not added until 1929. The figures for 1923 and 1926 were based on only half as many communities as those for 1928 and 1931.

The per cent of milk consumed which is pasteurized is shown in Table III. There has been an increase in all groups except Group IV, so that at present 90 per cent of the milk in the cities surveyed is protected in this way.

Since only 90 of the 355 communities in the state are included in the above tabulations, an attempt is made in Table IV to estimate how much of the total milk consumed daily in Massachusetts is pasteurized. Based upon the assumptions that those cities not reporting in groups III, IV, and V had the same per capita consumption and the same per cent of milk pasteurized as those that did report,

totals for the groups are estimated. Assuming that the towns under 5,000 had a per capita consumption equal to the average of all those answering the questionnaire and that none of the milk in these towns is pasteurized, the amounts sold in Group VI are estimated. In this way it is shown that approximately 80 per cent of the milk of the state is pasteurized. This is a conservative figure and we believe that 85 per cent would be nearer the fact, since it is known that considerable quantities of milk consumed in towns under 5,000 population are pasteurized.

These figures showing that the amount of milk protected by pasteurization has increased are corroborated by the fact that many communities have recently adopted a regulation requiring that all milk sold be pasteurized or from tuberculosis-free herds. Table

TABLE III  
AMOUNT OF MILK PASTEURIZED IN COMMUNITIES ANSWERING QUESTIONNAIRE

Group	1928		1931	
	Quarts Pasteurized	Per Cent of Total Pasteurized	Quarts Pasteurized	Per Cent of Total Pasteurized
50,000 and over (I)	1,020,285	93.0	990,536	96.1
25,000-50,000 (II)	150,172	84.5	180,651	89.5
15,000-25,000 (III)	94,394	61.2	130,454	80.0
10,000-15,000 (IV)	36,472	62.1	49,317	59.8
5,000-10,000 (V)	38,958	51.9	38,920	55.3
Total	1,340,281	85.7	1,350,958	89.7

TABLE IV.  
PER CENT OF TOTAL MILK OF STATE PASTEURIZED  
(An Estimate)  
(1931)

<i>Group</i>	<i>Quarts Sold</i>	<i>Quarts Pasteurized</i>
50,000 and over (I)	1,030,933	990,536
25,000-50,000 (II)	201,943	180,651
15,000-25,000 (III)	222,810 *	178,154 †
10,000-15,000 (IV)	96,332	57,657
5,000-10,000 (V)	137,450	73,920
Under 5,000 (VI)	174,000 ‡	.....
<b>Total</b>	<b>1,863,468</b>	<b>1,480,918</b>
<b>Per cent Pasteurized</b>	<b>79.5</b>	

\* Estimated on the assumption that the cities in the group not reporting had the same per capita consumption as in those reporting (see Table II).

† Estimated by applying the per cent of milk pasteurized for the group (see Table III) to the estimated total consumption.

‡ All towns under 5,000 included in this group. Quarts sold estimated by using the per capita consumption (0.44) of groups I-V inclusive (see Table II).

V shows that the number of cities and towns now having this requirement compose 84.5 per cent of the total population of the state. As may be noted in Table VI the communities which have recently adopted this regulation are not limited to any one population group, but there has been a tightening up in the regulations controlling milk in all of the groups since 1929. It is encouraging to know that the per cent of those so protected in

towns under 1,000 population has almost quadrupled in the last 3 years, and that the per cent in the remainder of the towns under 5,000 has almost doubled.

In 12 communities practically all milk is pasteurized since regulations are in force which require all milk to be pasteurized or certified and the amount of certified milk is not large. Moreover, large quantities of milk are being pasteurized in communities where regulations requiring it have not been

TABLE V  
COMMUNITIES REQUIRING MILK TO BE PASTEURIZED OR FROM TUBERCULOSIS-FREE CATTLE (1932) \*

<i>Group</i>	<i>No. of Towns in Group</i>	<i>No. of Towns having Regulation</i>	<i>Per Cent of Towns having Regulation</i>	<i>Pop. of Group</i>	<i>Pop. having Regulation</i>	<i>Per Cent of Pop. having Regulation</i>
50,000 and over	17	17	100.0	2,287,713	2,287,713	100.0
25,000-50,000	13	12	92.4	535,990	496,026	92.5
15,000-25,000	24	19	79.2	468,688	372,504	79.5
10,000-15,000	20	15	75.0	244,453	183,208	75.0
5,000-10,000	48	22	45.8	342,320	165,490	48.4
2,500- 5,000	57	16	28.1	199,221	53,150	26.7
1,000- 2,500	94	26	27.6	157,677	44,125	28.0
Under 1,000	82	17	20.7	39,904	10,444	26.2
<b>For All Groups</b>	<b>355</b>	<b>143</b>	<b>40.4</b>	<b>4,275,966</b>	<b>3,612,660</b>	<b>84.5</b>

\* Twelve of these communities require milk to be pasteurized or certified; several require all milk to be from tuberculosis-free cattle whether raw or pasteurized.

TABLE VI

PER CENT OF COMMUNITIES REQUIRING MILK TO BE PASTEURIZED OR FROM TUBERCULOSIS-FREE CATTLE \*

Group	Per Cent of Towns having Requirement		Per Cent of Population having Requirement	
	1929	1932	1929	1932
50,000 and over	83.3	100.0	88.0	100.0
25,000-50,000	66.7	92.4	67.0	92.5
15,000-25,000	48.1	79.2	50.8	79.5
10,000-15,000	44.4	75.0	44.7	75.0
5,000-10,000	17.3	45.8	17.8	48.4
2,500- 5,000	14.7	28.1	15.3	26.7
1,000- 2,500	12.9	27.6	13.1	28.0
Under 1,000	6.1	20.7	7.1	26.2
For All Groups	22.0	40.4	66.6	84.5

\* Twelve of these communities require milk to be pasteurized or certified; several require all milk to be from tuberculosis-free cattle whether raw or pasteurized.

passed, due to popular demand for protected milk. At the same time dealers are beginning to adopt pasteurization before required to do so because they are finding it the best kind of insurance against financial loss due to the inevitable occasional outbreak of milk-borne disease which continually menaces the dealer who sells raw milk.

That these regulations are being enforced seems to be indicated by the fact that bacteriological examinations of milk have increased even in the face of curtailed budgets, so that there is now an average of 6.6 examinations per 100,000 quarts of milk sold in comparison to 5.4 in 1928, and 4.9 in 1926. An increase of 22 per cent in bacteriological control during the present times seems remarkable indeed.

This increase is not simply more examinations performed by communities already making them; but new communities have added this protection, as shown in Table VII. It will be noted that towns under 10,000 show a good increase in such examinations.

The consumption of certified milk appears to have decreased. In the 1930 report it was estimated that 1.0 per cent of the total milk sold was certified compared to 0.6 per cent in 1927. The

amount has now dropped back to 0.62 per cent. It is not surprising, of course, that such a thing has happened in view of its higher cost and the fact that "rawness" of milk is lessening in its sales value.

#### OUTBREAKS TRACED TO MILK

The number of outbreaks of disease traced to milk has been remarkably small during the past 3 years: 5 of septic sore throat, 3 of typhoid fever, including 2 in which there was only 1 case each, 1 of scarlet fever, and none of diphtheria. The essential facts in regard to these are given in Table VIII. In only 1 was pasteurized milk involved. In this instance the man running the small pasteurizing plant had a mild case of scarlet fever and undoubtedly contaminated the milk after it was pasteurized while bottling with a hand-operated bottling and capping machine. Strangely enough, of 3 supplies which he was pasteurizing only 1—the last run through the plant each day—was contaminated, and all the cases occurred on this milk route.

The per cent of the total number of cases of each disease reported in the state during each period which has been traced to milk is shown in Table IX.



TABLE VII  
NUMBER OF COMMUNITIES MAKING BACTERIOLOGICAL EXAMINATIONS OF MILK

Group	1928			1931		
	No. Answer- ing Item	No. Doing Bacteriology	Per Cent Doing Bacteriology	No. Answer- ing Item	No. Doing Bacteriology	Per Cent Doing Bacteriology
50,000 and over	17	16	94.1	17	17	100.0
25,000-50,000	11	7	63.6	13	8	61.5
15,000-25,000	22	14	63.7	17	13	76.4
10,000-15,000	15	9	60.0	17	9	52.9
5,000-10,000	30	9	30.0	26	12	46.2
	95	55	57.9	90	59	65.7

Milk-borne diphtheria has not occurred in the state since 1925, scarlet fever spread by milk has almost reached the vanishing point, and the per cent of typhoid traced to this source has reached the remarkably low figure of 0.4 per cent. The reason for the fairly large proportion of septic sore throat being traced to milk is obvious, since the disease is seldom recognized and reported except in epidemic form. A number of physicians in this state re-

TABLE VIII  
LIST OF OUTBREAKS TRACED TO MILK  
1930-1931-1932

Year	Month	Place	Disease	Cases	Deaths	Source	Milk Pasteurized or Raw
1930	March	Ayer	Septic Sore Throat	178	0	Carrier ?	Raw
1930	April	N. Wilbraham	Septic Sore Throat	17	0	Carrier	Raw
1931	May	Marion	Septic Sore Throat	17	0	Cow	Raw
1931	May	Seckonk	Typhoid Fever	1	0	Carrier	Raw
1931	June	E. Bridgewater	Typhoid Fever	1	0	Case	Raw
1931	Dec.	Wareham	Septic Sore Throat	10	0	Cow	Raw
1931-2	Dec.-Jan.	Stockbridge-Lee	Typhoid Fever	28	2	Carrier	Raw
1932	Mar.-Apr.	Topsfield	Septic Sore Throat	18	3	Cow (infected by carrier ?)	Raw
1932	Aug.	Brockton	Scarlet Fever	9	0	Case	Pasteurized *

\* Milk undoubtedly infected in bottling machine by worker with missed case of scarlet fever.

TABLE IX  
MILK-BORNE DISEASE

PER CENT OF TOTAL CASES REPORTED REPRESENTED BY CASES TRACED TO MILK

Period	Septic Sore Throat	Typhoid Fever	Scarlet Fever	Diphtheria
1896-1900	....	2.1	0.0	0.1
1901-1905	....	1.9	0.6	0.0
1906-1910	....	8.1	3.8	0.2
1911-1915	....	5.3	1.2	0.1
1916-1920	75.5 *	6.9	0.4	0.1
1921-1925	10.1	6.7	0.2	0.1
1926-1929	58.3	8.3	0.3	0.0
1930-1932	27.6	0.4	0.002	0.0

\* Septic Sore Throat made reportable in 1914.

TABLE X  
TOTAL OUTBREAKS AND TOTAL CASES OF MILK-BORNE DISEASE \*

Period	Outbreaks		Cases		Cases per Outbreak
	For Period	For Year	For Period	For Year	
1886-1890	3	0.6	104	20.8	35
1891-1895	4	0.8	224	44.8	56
1896-1900	15	3.0	308	61.4	21
1901-1905	20	4.0	410	82.0	21
1906-1910	28	5.6	2,878 †	575.6	103
1911-1915	45	9.0	4,255	851.0	95
1916-1920	32	6.4	1,287	257.4	40
1921-1925	17	3.4	444	88.8	26
1926-1929 ‡	10	2.5	1,326	331.5	133
1930-1932 ‡	9	3.0	279	93.0	31

\* Includes typhoid fever, diphtheria, scarlet fever, and septic sore throat.

† First period in which septic sore throat was included. The large figures in this period, however, are due mainly to milk-borne scarlet and typhoid, details being given in the previous report referred to in the first paragraph of this paper.

‡ Listed separately so that figures since last report included in this paper may be followed through all the tables. Note that one period is 4 and the other is 3 years.

port sporadic cases which they claim to be clinically identical with those seen in epidemics.

In Table X is shown the number of outbreaks and the total number of cases of milk-borne disease during each 5 year period since 1895. The low figures at the beginning of the record are due largely to the lack of epidemiological investigation of outbreaks. Except in period 1906-1910 the large fluctuations have been due to septic sore throat.

#### DISCUSSION

It seems remarkable that actual figures do not show a decrease in the per capita consumption of milk. It was predicted when the milk questionnaires were sent out that they would show a material diminution in the use of milk. Two factors are perhaps responsible for its continued use under present conditions: (1) the often reiterated emphasis laid upon the necessity of including milk in the diet; (2) the fact that milk is at present prices one of the most economical foods obtainable.

The decrease in milk-borne disease during the 3 years covered, therefore, cannot be explained by decreased use of the product and it is hard to believe

that the low prevalence is entirely due to chance in the face of the fact that there has been a material improvement in the safeguarding of the supply. More of the milk has been pasteurized, the quality has been controlled by more bacteriological examinations and numerous communities have tightened up their regulations in regard to quality and sanitary control.

#### SUMMARY

1. Milk-borne disease has reached an extremely low figure in Massachusetts during the last 3 years.

2. The per capita consumption of milk is apparently the same as it was in 1928. That there has not been a decrease is no doubt due to the emphasis placed upon the nutritive and protective value of milk, and also to its present low cost.

3. The per cent of communities requiring milk to be pasteurized or from tuberculosis-free cattle has almost doubled, and 84.5 per cent of the population of the state lives in communities having this regulation.

4. It is estimated that 85 per cent of the milk supply of the state is now pasteurized.

5. There has been an increase in the bacteriological examinations performed to guard the quality of milk.

#### REFERENCE

1. Bigelow, G. H., and Forsbeck, F. C., *A.J.P.H.*, 20, 10:1094-1104 (Oct.), 1930.

# Test Room Studies in Employee Effectiveness\*

C. E. TURNER, DR.P.H., F.A.P.H.A. (*Life Member*)

*Department of Biology and Public Health, Massachusetts Institute of Technology,  
Cambridge, Mass.*

THROUGH the courtesy of the Western Electric Company, a report is presented here upon the public health aspects of certain studies in the conduct of which the writer served as consultant. The investigations have been too extensive to be encompassed adequately in this brief paper which will be limited to a description of this new type of industrial research and some of the major outcomes of the study.

The establishment of the test room study was the result of a 3-year investigation conducted by the company in coöperation with the National Research Council upon the relationship between illumination and the productivity of employees. A literal interpretation of the results would have suggested that poor illumination is desirable, for a comparison of two comparable groups of workers showed that those working with gradually reduced illumination had a higher output than those with ideal illumination. Such a conclusion would be obviously absurd.

What the investigation really showed was that the type of laboratory investigation which is possible in the exact sciences, where all but one factor can be controlled, is not possible in the study of human beings, and that other factors had entered the experiment which were

more important than illumination. This suggested to G. A. Pennock, now Assistant Works Manager, the desirability of undertaking a study of employee effectiveness under test room conditions in which all of the factors affecting the physical and mental status of the worker could be observed with the greatest possible completeness. The company sought to learn those conditions under which people work best. We wished to study the human energy flowing into the product in order that we might deal with it more intelligently.

In April, 1927, 6 experienced female operators, chosen at random, were removed from the department in which they were working to a small test room in the corner of a regular shop. Their work was the assembly of telephone relays and involved putting together a coil, an armature, contact springs and insulators in a fixture, and securing the parts in position by means of four machine screws. The girls were invited to the office of the Superintendent in charge where the plan and objectives of the study were explained to them. Although shy at this first meeting, they readily consented to take part in the study. They were expressly cautioned to work at a comfortable pace and not to make a race out of the test.

The working equipment in the test room was like that in the regular department except that there was a hole in the bench at the right of each girl's position into which completed relays

---

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.



*The Relay Assembly Test Room*

were dropped. The relay falls through a chute actuating a flapper gate. The opening of the gate closes an electrical circuit which controls a perforating device which in turn records the completion of the relay by punching a hole in a moving tape. This tape moves at the rate of  $\frac{1}{4}$ " per minute and has space for a separate row of holes for each operator. The punched tape furnishes a complete output record for each girl for each instant of the day. The tape mechanism also carries a bank of 5 message registers giving a numerical record of the total number of relays completed by each operator.

As we began the test, our objectives were stated in the form of 6 questions:

1. Do employees actually get tired out?
2. Are rest pauses desirable?
3. Is a shorter working day desirable?
4. What is the attitude of employees toward their work and toward the company?
5. What is the effect of changing the type of working equipment?
6. Why does production fall off in the afternoon?

Fairly good answers have been secured to all of these questions except No. 5. New questions have constantly arisen and some of them have been satisfactorily answered.

Some description may well be given

of the test room method as a means of research in industrial health and employee effectiveness. It is the observational method dealing simultaneously with many variables. Some factors can be controlled and made constant. One condition is changed at a time; but there are certain conditions which are not subject to experimental control. These must be watched carefully and inter-relationships established. Too often scientists have been guilty of the *post hoc, ergo propter hoc* fallacy. They have changed one condition and regarded it as the cause of all subsequent events. Such factors as the physical or mental health or the attitude of the employee cannot, of course, be accurately measured quantitatively. Over long periods of time, however, many factors can be satisfactorily evaluated by means of proper statistical procedures.

Disregarding the problems of placement and working equipment, it has been our assumption that the effectiveness of an individual will vary with (a) his bodily status or physiological efficiency (health, skill, endurance); (b) his mental state (contentment and freedom from worry, fear, anger, hate, shame, or other morbid preoccupa-

tions); (c) his zest for work (determined by the enjoyment in performing the work, the feeling of justice in his treatment, and the desire for securing reward).

TABLE I

Period Number	Period Name	Duration
1.	In Regular Department	2 weeks
2.	Introduction to Test Room	5 "
3.	Special Group Rate	8 "
4.	Two 5 Minute Rests	5 "
5.	Two 10 Minute Rests	4 "
6.	Six 5 Minute Rests	4 "
7.	15 Minute A.M. Lunch 10 Minute P.M. Rest	11 "
8.	Same as No. 7, but 4:30 stop	7 "
9.	Same as No. 7, but 4:00 stop	4 "
10.	Same as No. 7, (Check)	12 "
11.	Same as No. 7, but Sat. A.M. off	9 "
12.	Same as No. 3, (No Lunch or Rests)	12 "
13.	Same as No. 7, but operators furnish own lunch. - Company fur- nishes beverage	31 "
14.	Same as No. 11	9 "
15.	Same as No. 13	31 "
16.	Same as No. 13, except operators change posi- tion	4 "
17.	Same as No. 16, except 4:15 stop and Sat. A.M. off	25 "
18.	Same as No. 17, except Friday P.M. off	15 "

Beginning with Period 7, rest periods have begun at 9:30 in the morning and 2:30 in the afternoon.

Certain specific changes having to do with the length of the working day or week, with the introduction of rest periods and with the sitting position of the operators have been made. These are described in Table I.

At the beginning of the study, output records were kept for each girl in her regular department for 2 weeks without her knowledge. The girls were then moved to the test room where they worked for 5 weeks before any changes

in working conditions were introduced. The intentional changes subsequently introduced have not by any means been the only ones studied. The following statement presents other differences which we have recognized between test room and shop conditions.

In the test room, the group piece-work basis of payment paid each girl more nearly in proportion to her individual effort, since she was paid with a group of 6 instead of 100 or more. The girls in the test room assembled fewer different types of relays. The operators could read their exact output at any time from the recorder. The test room was not quieter; if anything, it was somewhat noisier than the regular department. New conditions of work provided an element of novelty. The girls realized that the experiment was receiving the attention of company officials, which meant that they were being noticed as individuals.

There has been a fundamental change in supervision. There was no group chief in the test room, but instead a "friendly observer" of the experiment. Discipline was secured through leadership and understanding. The girls were allowed to talk and to leave the bench whenever they liked; they were not compelled to pick up parts from the floor at the time they were dropped. An *esprit de corps* grew up within the group.

The girls were given physical examinations every 6 weeks. They objected to this at first but later each trip to the hospital became a "party."

Three types of records are kept in the test room in order that changes may be determined in (1) output, (2) the individual, (3) conditions of work.

1. Changes in production may be accurately measured and constitute one evidence of the effectiveness of the worker. By means of a conversion factor, all output data were expressed in terms of a single type of relay. From the output records previously men-

tioned, we have determined for each operator (1) the daily output; (2) the average hourly output at different times of day, for different days of the week and for different periods of the study; (3) average weekly output; (4) the number of defective relays; (5) the amount of repair work done. During the first few periods of the study, 15-minute output records were computed in order to study variability or uniformity of performance.

2. Data concerning *changes in the health, the habits, or the attitudes* of the operators have been secured from (1) physical examinations, (2) the comments of operators, (3) attendance irregularities, (4) occasional series for blood pressure and pulse rate records, (5) vascular skin reaction readings, (6) records of the hours of sleep, (7) social case records, (8) intelligence and dexterity tests, (9) questionnaires to reflect attitude toward working conditions, (10) diet records over certain periods.

3. *Changes in condition of work* have been indicated above. Records have also been kept of the types of relays assembled, the temperature and humidity of the room and any differences in the quality or methods of handling raw materials.

#### FINDINGS

The first specific problem which the test room sought to study was the effect of rest pauses which were introduced in Period 4. We did learn much concerning rest pauses but soon found that there was a continually rising output in the test room which was in large measure at least independent of rest pauses. At the end of 4 years, the individual operators had increased their output from 40 to 62 per cent. The relationship of this increase to rest pauses is shown in Chart I. It will be seen that output rose appreciably in Period 3 before rest periods were introduced. In Period 12, rest periods were entirely eliminated and during 12 weeks, output reached a new height. This continued and the unexpected increase in production which was independent of hours of work showed the absurdity of any experiment in which rest periods are introduced and changes in output ascribed to this cause without checking to see whether other factors

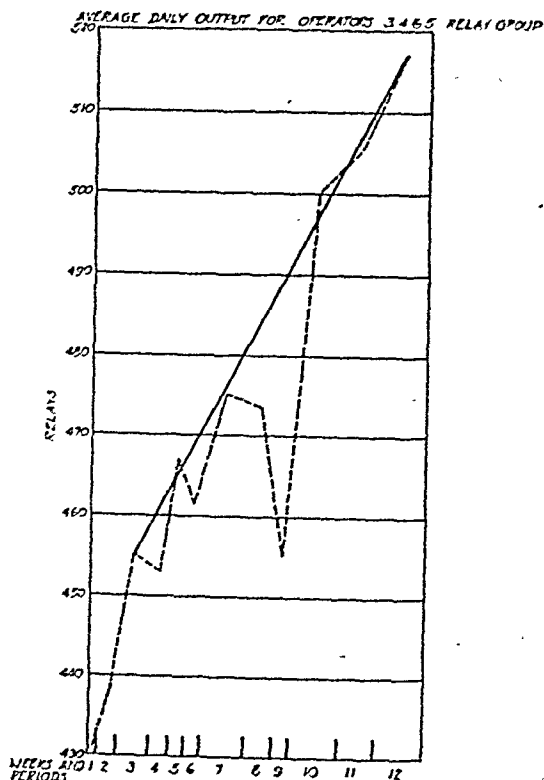


CHART I—Solid line shows daily output increase from one full-day period to the next full-day period. Dotted line shows the actual average daily output. The work periods indicated at the bottom of the chart are as follows: (1) regular department (2 weeks), (2) test room (5 weeks), (3) special gang rate (8 weeks), (4) two 5-minute rests (5 weeks), (5) two 10-minute rests (4 weeks), (6) six 5-minute rests (4 weeks), (7) lunch rest (11 weeks), (8) lunch rest and 4:30 stop (7 weeks), (9) lunch rest and 4:00 stop (4 weeks), (10) same as period 7 (12 weeks), (11) lunch rest and Sat. a.m. off (9 weeks), (12) same as No. 3 (12 weeks).

may have been responsible. With the reintroduction of rest pauses in Period 13, total output rose still further.

We inevitably became more and more concerned with the task of finding the explanations for the remarkably increased output. Was it because of better health or at the expense of health of the worker? Was it due to lessened fatigue? Was it due to changed pay incentive? Was it due to an improved mental state on the part of the worker, to the elimination of unhappy preoccupations, or a greater zest for work?

These studies gave us new knowledge of two types: (1) more information concerning the relative importance of fatigue, working conditions and mental attitudes as factors in the increased output; (2) specific information concerning the effect upon employee efficiency of certain specific factors like sleep, rest pauses, and sitting position.

It is impossible to present here the detailed statistical evidence upon which conclusions are based. These data may be found in the Progress Reports issued by the company and it is probable that many of them will be included in a summarizing volume which is in preparation. We give a brief statement of the more important findings and ask the reader to check the statistical evidence from the Progress Reports if he wishes to do so.

Let us first summarize the findings with respect to specific factors:

*Rest periods* were found to decrease the variability in output. They did not decrease total output but slightly increased it. (See Chart II, which shows output following the establishment of rest pauses in the test room and in 3 shop departments.) They reduced the amount of time which the operator voluntarily took away from her bench by about one-half. Single 10- or

15-minute rest periods in the middle of the half day were preferred to more frequent shorter rest pauses.

The physical examinations showed that the increased output was not at the expense of the *health* of the worker. The health of the girls remained constant or improved slightly.

The question naturally arose as to whether the increased output was due to muscular *fatigue*. The study of the

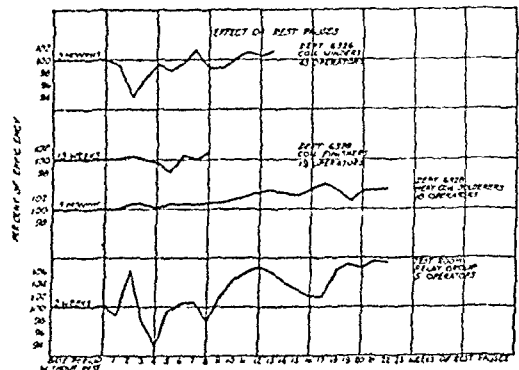


CHART II—The output for different groups of workers following the introduction of rest periods is compared with the output of a base period just before rest pauses were put into effect.

weekly output curve indicates that appreciable cumulative muscular fatigue does not exist. Vascular skin tests and pulse product readings were both taken to detect differences. They did not



This View of the Test Room Shows the Type of Bench, Working Equipment and Parts Used in Assembling Relays

show cumulative fatigue and the latter test indicated less fatigue in this group than among workers in other occupations who had been tested elsewhere.

It seemed likely that the more satisfactory *basis of payment* may have been a factor in increasing output. We sought to check this by setting up 2 other test groups. One group of relay assemblers was left in the regular department but paid as a small group. A group of mica splitters who had always been paid on a straight piecework basis were put in a test room. With Group I, we administratively changed only the pay incentive, although changes in attitude may also have taken place. With Group II, we provided test room conditions but did not change the pay incentive. The output in both groups went up over 10 per cent in a few months. We are inclined to believe that changed pay incentive may have been one factor in increasing output but it certainly was not the only factor.

An analysis of output on days fol-

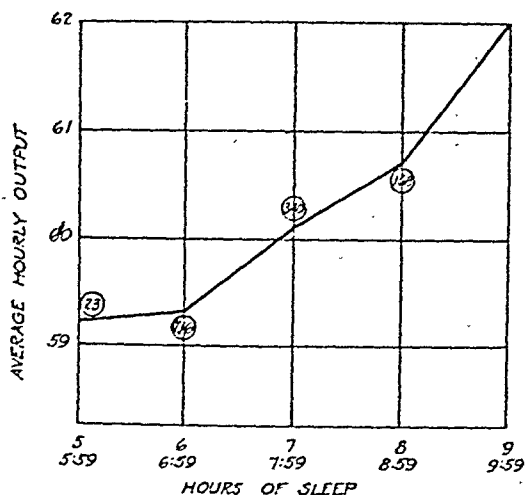
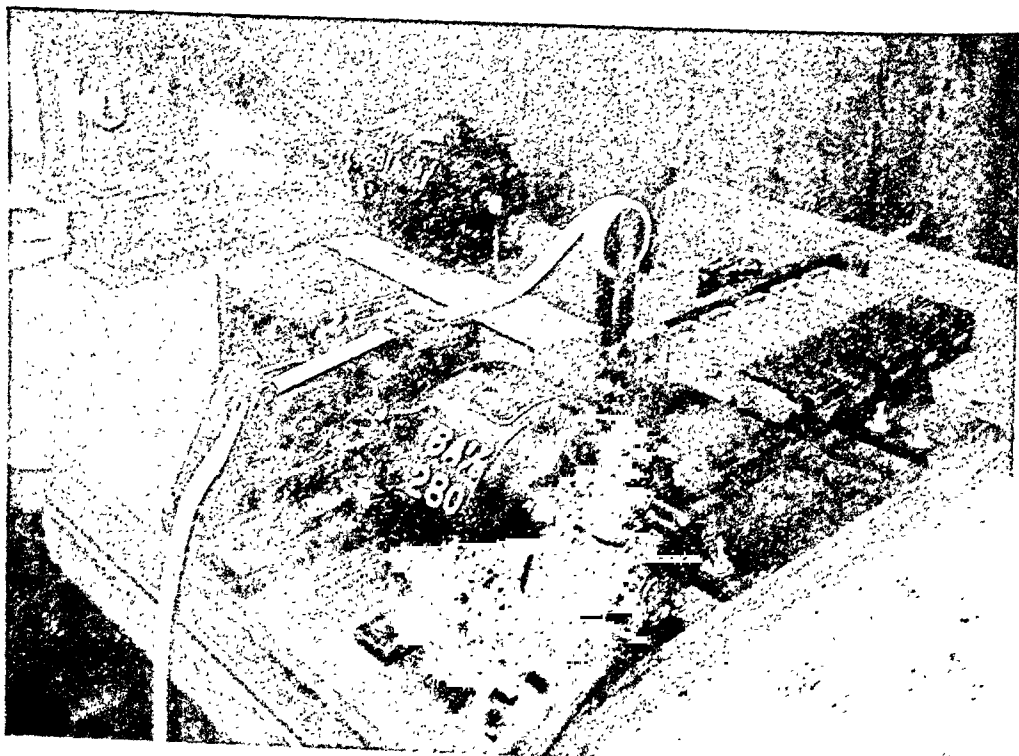


CHART III—Comparison of output with hours of sleep showing an average of averages for 5 operators of the first relay assembly group. Figures in circles indicate the number of observations for each point.

lowing various amount of *sleep* showed that sleep has a definite, though not a dominant effect on output. Chart III.

A comparison of the output for the first hour after the operators changed from one type of relay to another with the average output for the first full



The Moving Tape and Counter for Recording Output



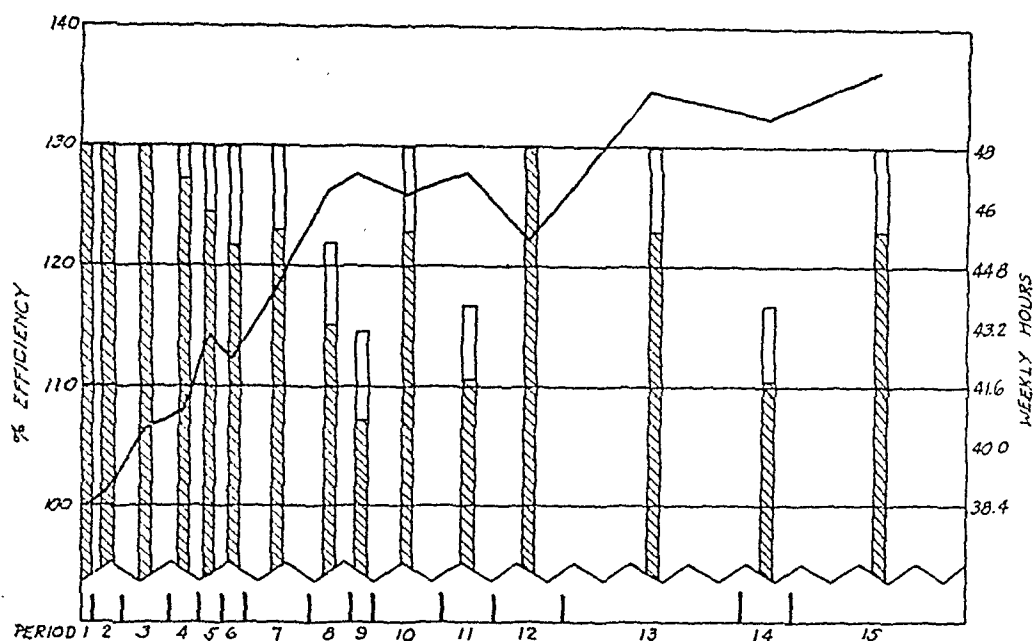


CHART IV—Percentage of efficiency in relationship to the length of the working week for operators 3 and 4 of the relay group. The types of working week in the different periods were as follows: (1) regular departments, (2) test room, (3) special gang rate, (4) two 5-minute rests, (5) two 10-minute rests, (6) six 5-minute rests, (7) a 15-

minute morning rest with lunch and 10-minute afternoon rest, (8) same as No. 7 with 4:30 stop, (9) same as No. 7 with 4:00 stop, (10) same as No. 7, (11) same as No. 7 with Sat. a.m. off, (12) same as No. 3 with no rests, (13) same as No. 7, (14) same as No. 11, (15) same as No. 13.

day following such a change showed that there is not a decrease in output immediately after so slight a *change in the nature of the work*.

*Shortening the working week* did not show an increase in hourly output but shortening the working day did show such an increase. Chart IV shows increases in efficiency when the week became shorter by reducing the length of the working day, but no increases when Saturday work was omitted. (Periods 11 and 14.)

The girls engaged in this type of work did not show a change in output during *menstrual periods*.

Changes in *sitting position* showed that the output of an operator is influenced by the workers sitting beside her.

Complete individual social case records were kept for test room employees. There is a definite relationship between output and satisfactory or

unsatisfactory *home conditions and social relationships*.

We at first thought that the *novelty* of test room conditions might be partly responsible for increased output but the continuing increase in production over a 4-year period suggests that it was not of great importance. In the judgment of the girls themselves, certain elements of the test room situation were listed in the following order of importance: (1) the small group, (2) the type of supervision, (3) earnings, (4) novelty, (5) interest of the girls in the experiment, (6) the attention given in the test room by officials and investigators.

In order to test the effect which the test room observer himself might have upon the group, the one who had been in the test room since its beginning was removed and his assistant placed in charge. The supervision in the test room remained approximately the same; there seemed to be no measurable

effect which could be assigned to the change in personalities.

#### SUMMARY

The phenomenal increase in the output of the original test room operators of from 40 per cent to 62 per cent, with less conscious expenditure of energy, indicates that a great deal more can be done to increase human productivity, with the lessening of the human energy cost (both physical and mental), without any change whatsoever in the set-up of the work itself. We know, from the physical examinations of the test room operators that their health status has not been impaired. We know, from our study, that muscular fatigue was, even in the beginning, an insignificant factor and has not since increased. We know, from our test room experience with these operators, that their mental tone and zest for work has increased tremendously. It should be remembered that these girls were working without critical supervision under the biologically natural situation of being allowed to work at their own pace without criticism because of fluctuating output instead of being expected to meet a given output every day.

We came to realize that neuromuscular fatigue is not of great importance in light industrial processes and that the mental attitudes of employees are of tremendous importance. Many questions remain unanswered but some contribution has been made toward a factual basis for employment management.

The test room method of research in this field is in itself a development of some significance and is likely to be used by industry in the future for the expansion of knowledge in the field of management and the study of human capacity.

Two specific outcomes of importance have resulted from the standpoint of company practices. After confirmatory tests in regular shop departments, rest periods have been successfully introduced in certain sections of the factory. The second and by far the more important development was the inauguration of an interviewing program in the shop departments and the development of the case method of instruction in supervisory training. In the test room we learned that mental attitude is important and we also learned much from employees' comments concerning the nature and importance of different factors in supervision and working conditions.

In order to secure the benefit of employees' reactions throughout the plant, a system of interviewing was developed in which the identity of the person interviewed was never disclosed but from which we secured valuable employee reactions upon which a changed attitude toward supervision has been built through the use of the case method in training present and prospective supervisors. The interview appears also to have contributed to the better emotional adjustment of many of the employers interviewed. Separate reports have been prepared describing the interviewing project.

# Purification of Beet Sugar Wastes\*

MAX LEVINE, PH.D., F.A.P.H.A.

*Professor of Sanitary and Technical Bacteriology and Bacteriologist, Iowa Engineering Experiment Station, Iowa State College, Ames, Iowa*

THE problem of treatment of beet sugar wastes in Iowa is complicated and aggravated by the fact that beet sugar manufacture is confined to a period of 3 or 4 months (October to January), of the year, and the low temperatures frequently prevailing at this season are detrimental to biological decompositions.

The wastes at the Beet Sugar Plant at Mason City, Ia., produced daily included:

Pulp or battery water, 700,000 gallons  
Flume, wheel, or wash water, 3,500,000 gallons  
Steffens waste, 200,000 gallons  
Lime waste, 200,000 gallons

warm, generally about 45-46° C. The wheel water is the liquid employed in washing and fluming the beets. Its composition changes considerably as the season advances, and its temperature is generally low, frequently close to the freezing point.

## COMPOSITION OF WASTE WATERS

The average compositions of these wastes for the year 1927 are shown in Table I.

The relative constancy of the pulp water and considerably increasing concentrations of organic matter in the wheel water as the period of operation progresses may be seen from Table II.

TABLE I  
COMPOSITION OF WASTE LIQUORS FROM BEET SUGAR FACTORY (1927)

Waste	Volume in Gallons	Analyses expressed as p.p.m.				
		Total Solids	Volatile Solids	NH <sub>3</sub> and Org. N	O <sub>2</sub> Cons.	O <sub>2</sub> Dem.
Wheel water	3,500,000	1,950	790	16.4	440	240
Pulp water	700,000	2,550	2,130	55.9	1,280	1,130
Steffens waste	200,000	21,900	12,800	969.0	3,410	3,580
Lime waste	200,000	42,100	15,200	145.0	3,290	1,440

The pulp or battery water is the liquid remaining after extraction and crystallization of the sugar. It is relatively constant in composition throughout the period of operation and quite

The oxygen demand results are particularly striking. Whereas the pulp water required 1,120 p.p.m. in October, 1,100 p.p.m. for the first 3 weeks, and 1,160 p.p.m. for the last week in December, the B.O.D.'s of the wheel water for the corresponding weeks were, 160 p.p.m., 385 p.p.m. and 720 p.p.m. respectively.

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

TABLE II  
SHOWING RELATION OF PERIOD OF CAMPAIGN TO COMPOSITION AND TEMPERATURES  
OF PULP AND WHEEL WATER WASTES\*

Period (1927)	Volatile Solids		O <sub>2</sub> Cons. (Dis.)		Kj N	
	Pulp	Wheel	Pulp	Wheel	Pulp	Wheel
Oct. 12-Nov. 8	1,870	340	970	190	53	15.0
Nov. 9-Dec. 1	2,140	500	1,100	220	56	15.5
Dec. 2-Dec. 23	2,420	910	1,360	420	59	19.5
	Oxygen Demand		Temp. °C.		H <sup>+</sup> ion conc.	
	Pulp	Wheel	Pulp	Wheel	Pulp	Wheel
Oct. 12-Nov. 8	1,120	160	47.5	29.1	6.0	7.8
Nov. 9-Dec. 1	1,150	195	44.6	16.9	6.6	7.3
Dec. 2-Dec. 23	1,100	380	45.6	13.1	6.0	8.1
Dec. 24-Dec. 31	1,160	720				

\* Figures given in round numbers when two or more significant figures are shown.

#### PURIFICATION EFFECTED BY PONDING PULP WATER

The purification effected by settling pulp water, and the combined pulp and wheel water wastes in open ponds will be briefly considered.

During the 1926 season, the pulp water was passed through a series of 5

shallow ponds covering an area of about 22 acres. The total storage period was approximately 12 days, the first pond accounting for 3 days storage.

It is evident that a 12-day sedimentation period through 5 ponds gave results only slightly better than obtained in 3 days through the first pond

TABLE III  
EFFECT OF PONDING PULP WATER (1926 SERIES)

Sample (Oct. 1926)	Storage Days	Vol. Sol.	Kj N	O <sub>2</sub> Cons.	O <sub>2</sub> Dem.	pH	Temp. °C.
Pulp Water	0	1,500	50.0	1,360	805	5.1	42.2
1st Pond Eff.	3	510	37.5	212	565	4.5	20.4
5th Pond Eff.	12	750	32.5	160	538	5.1	4.7
PER CENT REDUCTION							
1st Pond	3	65.8	25.0	83.7	29.7		
5th Pond	12	50.1	35.0	89.1	33.1		

—a reduction of 83.7 per cent oxygen consumed by settling in the first pond rose to but 89.1 per cent after passage through the series of 5. The B.O.D. reductions were only 29.7 per cent and 33.1 per cent after 3 and 12 days settling respectively. The relatively slight reductions in B.O.D. as compared with oxygen consumed effected by ponding are striking.

In the 1928 season several of the ponds (Nos. 1 and 2) were reconstructed so as to make 5 smaller but deeper ponds. The first of these had a capacity of 24 hours' storage of pulp water and the total storage period was estimated at a little over 4 days.

It may be seen from Table IV that considerable reduction in volatile solids and oxygen consumed is obtained by

ponding pulp water for 1 to 4 days, but that reductions in oxygen demand were very moderate. This was in line with the observation on ponding in 1926. On the basis of Table IV and other observations, it was found that settling pulp water in an open pond for 24 hours effected reduction as follows:

Volatile solids	50-62%
Oxygen consumed	77-80%
Oxygen demand	13-22%

The reaction became distinctly acid during the 24-hour storage.

There are some reports in the literature that liming the settled pulp water to neutralize acidity would stimulate biological action and effect further purification. About 2 tons of lime per million gallons were added daily to the effluent from the pond receiving the

TABLE IV  
EFFECT OF PONDING PULP WATER (1928 SERIES)

Samples (Oct. 1928)	Storage days	Vol. Sol.	Kj N	O <sub>2</sub> Con.	O <sub>2</sub> Dem.	pH	Temp.
Pulp Water	0	1,840	60	875	991	6.6	43.1
1st Pond Eff.	1	720	40	180	866	4.6	37.6
5th Pond Eff.	4	536	27.5	100	740	5.4	13.6

PER CENT REDUCTION

	-1	60.9	33.3	77.4	12.6		
	4	70.9	54.2	91.4	25.4		

TABLE V  
EFFECT OF LIMING SETTLED PULP WATER AND SUBSEQUENT STORAGE

Period 1928	Lime* Added	B.O.D. (5 days at 20° C.)		
		Pond A Eff.	Pond E. Eff. †	Per cent Reduction
Oct. 2-Oct. 23	None	866	740	14.5
Oct. 24-Nov. 27	2 Ton	874	811	7.2
Nov. 28-Dec. 23	None	1,052	736	30.0

\* Per million gallon of Pond A Effluent.

† Pond A Effluent stored about 3.5 days in open ponds.

pulp water, and the mixtures allowed to flow through a series of ponds giving an additional storage period of about 3.5 days. The results are summarized in Table V.

The evidence is distinct that under the conditions of these observations liming was not beneficial.

#### PURIFICATION EFFECTED BY PONDING PULP AND WHEEL WATER

The total purification (B.O.D. reduction) effected by ponding the pulp and wheel water is indicated in Table VI, for the year 1927. At this time the pulp water was settled in 2 ponds for about 4 days, the wheel water in a third pond for about  $\frac{1}{2}$  day, and the effluents from the pulp and wheel water ponds mixed and allowed to flow through 2 small ponds which provided an additional storage of 1 day. Reduction of 39.4 per cent to 48.2 per cent in B.O.D. were effected by this ponding system.

Dorr type of clarifier for a short period, (2) the efficiency of filters for purifying an effluent from such a settling tank, and (3) the possibility of using a washable filter for preliminary treatment.

The Dorr tank employed was an old type 2-story one. The wheel and pulp waters were brought to the tank and allowed to enter in a ratio of 5 to 1, at a rate which afforded an average detention period of about 1 hour. During the last few weeks the detention was not over 40 minutes because of loss of capacity due to accumulation of settled solids. The effluent from this Dorr tank was pumped to a small tank which served as a distribution box for dosing experimental filters. The waste was applied to filters by means of tipping troughs, which discharged the liquid onto perforated trays suspended about 6 to 9" above the top of the filling materials.

In one series of experiments the

TABLE VI  
PURIFICATION OF PULP AND WHEEL WATER BY PONDING

Period 1927	No. of days	Average B.O.D.		B.O.D. Combined Wastes	B.O.D. Final Pond Eff.	Per cent Reduction
		Pulp	Wheel			
Oct. 2–Nov. 5	25	1,123	158	319	193	39.4
Nov. 9–Dec. 1	23	1,150	195	354	228	35.6
Dec. 2–Dec. 23	22	1,095	326	496	257	48.2
Dec. 24–Dec. 31	8	1,193	720	794	470	40.8
Weighted Average		1,128	289	429	250	41.7

#### PURIFICATION OF MIXTURE OF PULP AND WHEEL WATER BY SETTLING AND FILTRATION

A series of observations was made to ascertain (1) whether a mixture of wheel and pulp water in the proportions produced in the plant would become appreciably improved by settling in a

filters consisted of quartzite ( $\frac{1}{2}$  to  $1\frac{1}{2}$ "), or dolomite (1 to 3"). The filters were 3' square and 9' deep. In another series the Dorr effluent was applied to a shallow washable cinder filter, 4 x 6' in area and 3' deep, and the effluent, after settling, applied to a cinder or dolomite filter 3' square and

TABLE VII  
PURIFICATION OF MIXTURE OF PULP AND WHEEL WATER BY  
SETTLING AND FILTRATION

Treatment	Solids			Nitrogen		O <sub>2</sub> Cons.	O <sub>2</sub> Dem.	Temp. °C.	H <sup>+</sup> Ion Conc.
	Susp.	Tot.	Vol.	Org.	NH <sub>3</sub>				
None (Raw Waste)	1088	2052	944	18.5	9.0	406	349	28.3	7.7
One Hour Sedimentation	108 (90.1)	1080 (47.3)	632 (33.0)	9.5 (48.7)	8.0 (11.0)	350 (13.8)	249 (28.4)	27.7	7.2
Filtration 3 ft. cinders		840 (59.0)	520 (44.6)	5.5 (70.3)	4.5 (50.0)	149 (63.2)	93 (73.4)	24.3	7.4
Filtration 3 ft. then 6 ft. cinders ( $\frac{1}{4}$ - $1\frac{1}{2}$ in.)		732 (64.3)	268 (71.4)	3.0 (83.8)	2.0 (77.8)	61 (84.9)	24 (93.2)	19.2	7.8
Filtration 3 ft. cinders then 6 ft. dolomite (1-3 in.)		776 (62.2)	452 (51.9)	7.0 (62.2)	3.0 (66.7)	132 (67.4)	68 (80.6)	15.2	7.8
Filtration 9 ft. dolomite (1-3 in.)		780 (62.0)	488 (48.0)	5.0 (72.9)	5.0 (44.3)	161 (60.2)	107 (69.5)	15.9	7.7
Filtration 9 ft. quartzite ( $\frac{1}{2}$ - $1\frac{1}{2}$ in.)		688 (66.4)	432 (54.0)	4.5 (75.7)	3.0 (66.7)	138 (65.9)	84 (75.9)	16.6	7.7

Rate of application to filters 2,000,000 g.p.a.p.d.  
Figures in ( ) indicate over-all per cent reductions.

6' deep. The cinders were  $\frac{1}{4}$ " or larger.

The results for a series of observations when the filters were dosed at 2,000,000 gal. per acre per day are summarized in Table VII.

Sedimentation in an old type 2-story Dorr tank effected reductions of 90 per cent in suspended solids and 33 per cent in volatile solids. The remaining suspended solids were quite objectionable from the standpoint of subsequent treatment by filtration on fine materials because of their clogging tendencies. Reduction of 48.7 per cent in organic nitrogen, 13.8 per cent oxygen consumed and 28.4 per cent oxygen demand were obtained by 1 hour settling.

Filtration of the settling tank effluent through 9' of quartzite resulted in over-all reduction of 75.7 per cent organic nitrogen, 65.9 per cent oxygen

consumed, and 75.9 per cent oxygen demand during the first month of operation (Table VII). During the second month of operation, after the filter had an opportunity to ripen, the efficiency increased considerably, to 95.4 per cent for organic nitrogen, 80.0 per cent oxygen consumed and 90 per cent oxygen demand. The coarser dolomite was about 20 to 25 per cent less efficient.

Coarse cinders ( $\frac{1}{2}$  to  $1\frac{1}{2}$ " ) were particularly effective. When double filtration through 3' of a washable cinder filter was followed by filtration through 6' of cinders, reductions were obtained as follows: volatile solids 71.4 per cent, organic nitrogen 83.8 per cent, oxygen consumed 84.9 per cent and oxygen demand 93.2 per cent. The use of the washable filter markedly reduced clogging. Filtration through shallow cinder beds (3') was also very

effective, with reductions of 44.6 per cent volatile solids, 70.3 per cent organic nitrogen, 63.2 per cent oxygen consumed, and 73.4 per cent oxygen demand. Filtration through 3' of cinders was about as efficient as 9' of the relatively coarse dolomite (1-3").

A mixture of 1 part Steffen's waste to 20 parts of the effluent from the ponding system receiving both wheel and pulp water was applied to a cinder filter at 2,000,000 gal. per acre per day. The B.O.D. of the applied wastes varied from 290 to 680 p.p.m., the effluents from 4 to 76 p.p.m. The average B.O.D. of the applied wastes was 442 p.p.m., the effluent 30.3 p.p.m. or a reduction of 93.1 per cent.

#### SUMMARY

The paper is based on observations over a period of 3 years at a large beet sugar manufacturing plant, and includes a consideration of the relative efficiencies of ponding and biological treatment on trickling filters of various types.

The wastes which were subjected to study at the plant in question included

1. *Pulp or battery water* (about 700,000 gal. per day)—This is the waste water from the sugar, diffusion batteries and is generally very warm, (40-50° C.) and high in oxygen demanding constituents (800-1300 p.p.m. B.O.D.).

2. *Wheel water* (about 3,500,000 gal. per day)—This is the water used in fluming and washing the beets. It contains considerable mud, silt, etc., and its oxygen demand increases with progress of the manufacturing season from 150 to over 500 p.p.m.

3. *Steffen's waste* (about 200,000 gal. per day)—This is the liquid residue, from the Steffen's process for recovery of sucrose, and is very high in solids, (over 20,000 p.p.m. total, and 13,000 p.p.m. volatile solids) and in oxygen demand (3,600 to 5,000 p.p.m. B.O.D.).

Settling of pulp water in open ponds for 24 hours, effected reduction of 77 to 80 per cent in oxygen consumed, but only 13 to 22 per cent in oxygen demand. Volatile solids were reduced

by 50 to 62 per cent and the acidity rose from pH 6.6 to pH 4.5. The temperature of the effluents from the ponds varied on different years, but was always sufficiently high (22 to 32° C.) for efficient biological purification on filters.

Addition of lime (about 2 tons per 10<sup>6</sup> gallons) to pulp water after preliminary settling did not produce better effluents than simple sedimentation, as respects B.O.D.

Ponding wheel water effected very considerable reductions in suspended matters (93 to 98 per cent) but little improvement as respects B.O.D. The wheel water temperature during the latter part of a manufacturing season may be so low that, after sedimentation in open ponds, the effluent may be close to the freezing point and unsuitable for efficient biological purification.

Passage of a mixture of 1 part pulp water and 5 parts wheel water through a Dorr thickener, of 1 hour settling capacity, effected reductions of approximately 90 per cent suspended solids and 50 per cent organic nitrogen. Filtration of the effluent from this Dorr thickener through 9' of quartzite at 2,000,000 g.p.a.p.d. (1½ to 1½") effected reduction as follows: volatile solids 72.4 per cent, organic nitrogen 95.4 per cent, oxygen consumed 80 per cent, and oxygen demand 90 per cent. Coarser filling material, (1 to 3") gave inferior effluents.

Coarse cinders (1½ to 1½") were found to be particularly efficient, effecting reduction of over 95 per cent when the mixed wastes were applied at 2,000,000 g.p.a.p.d.

Pulp water can be purified efficiently on trickling filters provided a suitable method for removing suspended solids could be devised.

Steffen's waste when diluted with 20 parts of other wastes, (pulp and wheel waters) was amenable to biological purification on trickling filters.



# Administration of a Bureau of Tuberculosis in a City Department of Health\*

H. R. EDWARDS, M.D.

*Director, Bureau of Tuberculosis, Department of Health, New Haven, Conn.*

THE first question raised by many departments of health relative to a bureau of tuberculosis in their organization is: Is it necessary? Why cannot the customary Bureau of Communicable Diseases handle tuberculosis as well as all other diseases of the same classification? Why cannot it be carried by the voluntary agency?

The reasons for a special bureau are:

1. Primarily tuberculosis is a chronic disease in contradistinction to most other communicable diseases. It requires longer periods of supervision, and that, in itself, means a different mode of attack and follow-up not needed in the average care of communicable disease.

2. Tuberculosis still holds an important place in our general death rate, taking its greatest toll during the early productive age periods of adult life.

3. The discovery, treatment, hospitalization and follow-up of tuberculous individuals and contacts have been responsible for the development of a huge aggregation of machinery that can hardly be utilized today to its utmost without some special training and understanding of the tuberculosis problem as a whole and in its integral parts.

4. The control of tuberculosis is primarily a function of the official health agency.

The organization and operation of a bureau of tuberculosis will add a minimum of \$5,000 or more annually to the budget of the department of

health, depending upon the scope of the services rendered. This factor automatically eliminates the smaller departments. To gain some idea of the size of the communities now operating bureaus of tuberculosis, the following list of cities is given.\*

## I. Cities Over 500,000 (13)

Buffalo, N. Y.  
Cleveland, Ohio  
Detroit, Mich.  
Los Angeles, Calif.  
New York, N. Y.  
Philadelphia, Pa.  
San Francisco, Calif.

## II. Cities Over 250,000 to 500,000 (24)

Cincinnati, Ohio  
Milwaukee, Wis.  
Newark, N. J.  
Seattle, Wash.

## III. Cities Over 100,000 to 200,000 (41)

Duluth, Minn.  
Fall River, Mass.  
Grand Rapids, Mich.  
New Haven, Conn.  
Oakland, Calif.  
St. Paul, Minn.  
Syracuse, N. Y.  
Yonkers, N. Y.

It is obvious that of the 88 cities of over 100,000 population, only a few have organized bureaus of tuberculosis, and the New Haven experience has shown that a bureau is practical in cities of 150,000 or more.

The functions of a bureau of tuberculosis are as follows:

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

\* This list was supplied in 1929 by the A.P.H.A. A more recent and complete list is not available.

1. To correlate, articulate, and lead the way in all local tuberculosis activities, official and voluntary.

2. To secure the prompt and accurate reporting of active cases and deaths.

3. To coöperate with other agencies in outlining educational campaigns for the discovery and control of tuberculous cases and contacts.

4. To keep an accurate check on the hospitalization of cases.

5. To tabulate and analyze morbidity and mortality statistics of tuberculosis.

In some communities the bureau may be responsible for hospitalization facilities, either through direct control of the institutions or power to subsidize existing facilities by the placing of cases in local general hospitals to await vacancies in sanatoria. Each community will present problems and conditions peculiar to itself; so the functions of the bureau will vary accordingly. In general, it may be said that a bureau of tuberculosis must interest itself in any project that will result in the eradication of tuberculosis in a given community.

*Personnel*—The minimum requirement would be a director and a clerical assistant. Other personnel depends upon the scope of the services undertaken, such as nursing, clinics, etc. The director should be a graduate M.D. in good standing, with special training in tuberculosis problems as an administrator and clinician, and his personality should command the respect of the local profession.

Ideally, the director should be on a full-time basis, though there are communities in which a part-time service is reported to be satisfactory. It would be better to have a good part-time than a poor whole-time director. There is sufficient work in any community capable of supporting a bureau to keep the director well occupied.

The duties of the director vary, but generally the following will be found applicable in almost any case, and for one with initiative and industry, in-

numerable openings will develop in which he can expand his program at will:

1. All policies of the bureau should be outlined by the director.

2. The director should be thoroughly conversant with the detail management of the office, and especially the record system.

3. He should accord consultation service for private practitioners, on both free and pay cases.

4. Educational activities should include the various forms of visual instruction for children and adults, newspaper publicity, lectures, magazine articles, etc.

The director should be the driving force behind the community's tuberculosis program.

A clerical assistant is necessary if the records are to be maintained. The success of the program will depend upon their accuracy and completeness, for it is this material that forms the foundations for expansion and the ultimate control of the disease.

*Equipment*—In addition to the usual office equipment the most important requirement is adequate filing facilities. Our experience has proved the economy of visible files, rather than the old vertical type, for active cases under supervision.

The average bureau will divide its cases in various ways: active, or those under supervision; inactive, or those moved or lost, and dead. Some subdivide their active files into clinically active, quiescent, and arrested. This latter subdivision is not of great value because of the difficulty in keeping the data accurate. It requires periodic check-ups on the clinical status of the patient that are almost impossible if the cases are not under the supervision of a trained tuberculosis clinician.

#### LEGISLATION

Public health and preventive measures cannot function without the backing of statutory laws and health regulations, enforceable by local courts. The same is true of tuberculosis.

Invariably, tact and diplomacy will sell more tuberculosis prevention than the invoking of laws. Nevertheless, situations arise when legal backing is absolutely necessary to the promotion of sound public health. The accuracy and persistency with which the local bureau does its work will determine the effectiveness of the letter of the law. The law requiring the reporting of tuberculosis is of no value unless an effort is made to make it so. Reporting will not necessarily be prompt after writing the physician a letter, or sending him a copy of the law. Every available source must be constantly checked to make sure that the physician has not forgotten; the same is true of sanatoria, hospitals, etc.

It is the responsibility of the bureau to make the law effective. If the bureau becomes lax, the observance of laws and regulations becomes lax. It is a matter of eternal vigilance. The following laws, rules and regulations should be on the statute books of the state, and in

the ordinances of the local community.

In many instances similar legislation exists, but it is antiquated and has no teeth, or no provision is made for enforcement. In such cases, the laws should be redrafted to meet the existing conditions.

1. Report in writing of all forms of tuberculosis to the local health officer within 24 hours after the diagnosis is made by: physicians, hospitals, sanatoria, undertakers, laymen, and others having knowledge of a case.

2. Report by hospitals, sanatoria, or other institutions caring for cases of tuberculosis, all forms, on admission and discharge; the discharge report, stating condition and destination of patient.

3. A law empowering the local health officer to hospitalize any case of tuberculosis considered a menace in the home in which he lives, or to the public at large. To work this effectively, a suitable place should be provided to which the courts can commit the recalcitrant case.

4. Either the practitioner indicates by his report that he will assume all responsibility for the proper supervision of the case, or that responsibility be assumed by the local health officer.

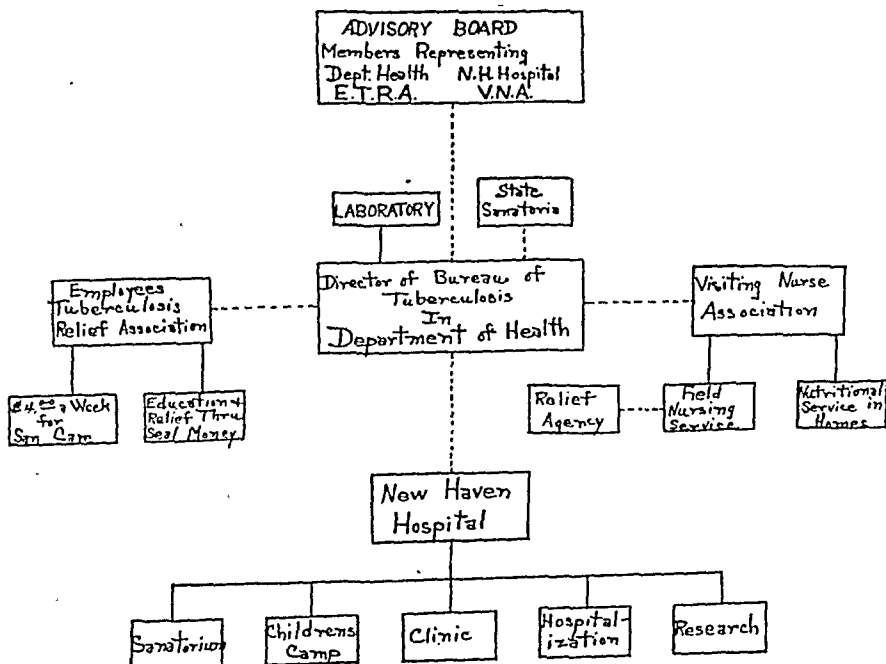


CHART 1

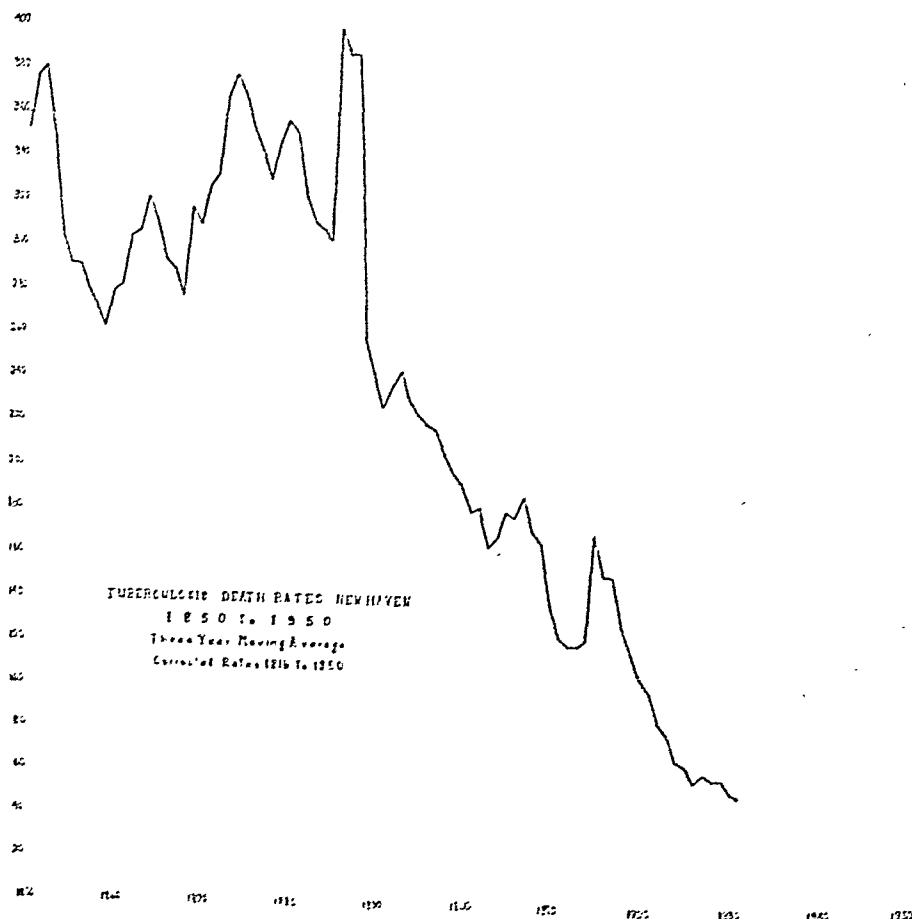
Laws prohibiting promiscuous expectation, common drinking cups, common towels, etc., are secondary to the foregoing.

Legislation is very important and requires expert opinion and advice.\*

control of the personnel handling cases in each of the agencies in New Haven dealing with tuberculosis, he is supposed to be the articulating and directing head.

The plan, as started in 1926, is still

CHART 2

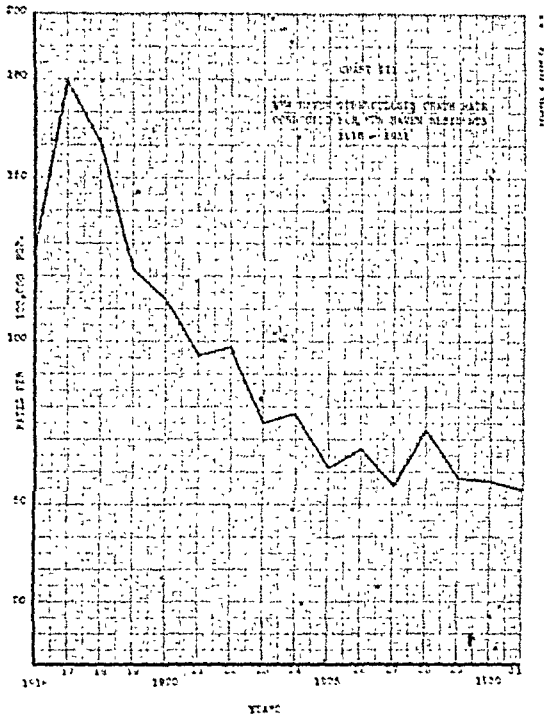


#### THE NEW HAVEN PLAN

The Bureau of Tuberculosis in the New Haven (Conn.) Department of Health was organized in 1926.<sup>1</sup> The Bureau of Tuberculosis is deemed to be the hub about which all tuberculosis activities in New Haven revolve, and while the director does not have direct

in operation. A group of specialized tuberculosis nurses previously under the director of the Bureau of Communicable Diseases was dropped and our nursing service was put under the New Haven Visiting Nurse Association on a generalized plan. The bureau subsidized the Visiting Nurse Association service with an amount equal to that paid for specialized service. As yet the Board of Health does not entirely pay for nursing service rendered. The municipal dispensary was abandoned and all

\* *Technical Series, No. 8, A Manual of Tuberculosis Legislation*, by James A. Tobey, published by the National Tuberculosis Association, will give to those interested as full information on the subject as is possible in a general way.



dispensary activities were centered at the New Haven dispensary, the outpatient department of the Yale School of Medicine. It is a polyclinic, centrally located and convenient to all transportation facilities, and is adequate for local conditions.

To facilitate coöperation, an Advisory Board of the Anti-Tuberculosis Program was created. It includes representatives of the various affiliated organizations, and its function is purely advisory. The recommendations of this board in most instances have been accepted and put into effect by the various agencies. The chairman is the Health Officer of New Haven, and the secretary, the director of the Bureau of Tuberculosis.

#### CASE FINDING

New Haven is fortunate in having legislation on the reporting of the aforementioned cases. It is not 100 per cent efficient and usually fails in the reporting of private pay cases under some physicians. Eventually, however, the majority of these cases do come to our attention. We have made every effort to

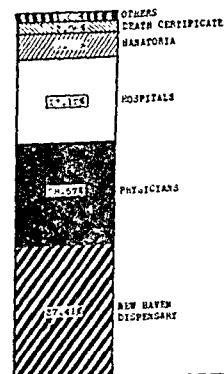
coöperate and protect the rights of practitioners. As soon as a case is reported, the physician is asked if he wishes nursing service, and his reply is entered on the case record. Frequently we find that cases reported by practitioners as private have been known to the Visiting Nurse Association for some time, and it is this type that the practitioners so frequently criticize the nurses for interfering with. In general, however, the physicians are very coöperative and quick to turn to us for advice and aid in placing their cases. The percentage of new cases of the total reported to the bureau annually by physicians has increased from 22.3 in 1928 to 28.6 in 1931.

The bureau receives routine reports from the following sources, all of which are checked against our files and kept up to date.

1. Physicians
2. Bureau of Vital Statistics
3. Hospital admissions and discharges
4. Sanatoria admissions and discharges
5. City and State Laboratories—reports on sputa examinations
6. United States Veterans' Bureau—regional office in Newington
7. The New Haven Dispensary
8. Reports on X-rays made on the Department of Health plan

We receive a monthly report from sanatoria and most hospitals in addition

CHART IV  
REPORTING OF NEW CASES TUBERCULOSIS  
IN  
NEW HAVEN 1931



to the regular reports at the time of admission and discharge. It is a summary of the new admissions, discharges, with classification of diagnosis, and a list of patients still residents in the institutions. Thus we have as complete information as possible on all known cases.

To maintain these data, constant checking is required. All cases known to be under private practitioners are checked every six months for address and condition through the doctor. The remainder of our roster is checked through the Visiting Nurse Association, as they follow all other cases. Our files are checked annually against each new city directory.

At present we have about 1 per cent of the estimated population of New Haven on our active roster as diagnosed cases.

A diagnosed case (pulmonary, childhood type, and other forms) is never dropped unless it moves out of town, is lost, or dies. The frequency of visits is determined by the clinical condition of the case. We are taking a similar attitude toward tuberculin positive chil-

dren—we endeavor to follow them until they reach 25 years.

Within the past year, we have set up sheets for each family in which we have a member with a diagnosis of tuberculosis. These records enable us to study each family as a unit, keep track of the examination of contacts with those families, and to determine general policies in supervision. Over 50 per cent of our families (675) are under dispensary care, and a recent check-up<sup>2</sup> indicated that over 70 per cent of the individuals in families in which a diagnosis of tuberculosis had been made had been examined at some time since the first diagnosis. The percentages were higher in those families in which a pulmonary diagnosis had been made.

CLINICAL SERVICE

All dispensary activities are centered at the New Haven Dispensary. There are 8 clinic periods each week, including 1 night period, 4 for adults and 4 for children. The pediatric division takes children from birth to 6 years, and the general clinic from 6 years up.

The average number of visits per

CHART V  
FAMILY TUBERCULOSIS SUMMARY

Date, April 24, 1932.

Name, BAILEY      Address: 1. 119 Hazel St.      2. 77 Hazel St. 6-11-32  
3.      4.      5.      6.  
First diagnosis in family: Mother 1921      Primary source: Mother

Family	Date of Birth	Admit'd to Clinic	Tuberc'n	Sputum	X-Ray	Diagnosis		Death			Hosp. or San.	Disp. No.
						Date	Class.	Date	Cause	Place		
F. John	1882	6-11-32				6-11 '32	Non-Tbc.					50172
M. Emma	1884	12-6-21		Pos. 1921 4-14-28	(1)	1921	Pul. Tbc. M.A.	8-29 '28	Pul. Tb.	Shelton	W.W.W. Shelt.	52212
John	1917	3-3-23	1/10 Pos. 2-10-27		(3)	3-3 '23	Contact No Manif	est				17507
Sylvia	1922	4-19-26	1/50 Pos. 4-21-26		(4)	4-19 '26	Contact No Manif	est				17784

registered case has never been over 2.3 for the past 4 years. This is below the American Public Health Association standards of 3.0, but we do not feel that our service is below that deemed necessary; in fact, we feel that we schedule return visits more frequently than is absolutely necessary. Approximately two-thirds of our cases on the dispensary roster are contacts, and with better than 2 cases hospitalized at all times for each annual death, there are few open cases in the community that need frequent dispensary supervision.

There are 2 trained tuberculosis clinicians at every clinic and 3 if the demand is sufficient. Thus every patient is able to be cleared within a reasonable time. In addition there are 2 fourth-year medical students working under the direction of the trained staff. The director of the Bureau of Tuberculosis takes part in 3 of the general clinics and thereby keeps in close touch with the cases handled.

The active files of the tuberculosis dispensary include all cases with a diagnosis of tuberculosis, the contacts to those cases, and all children with a positive tuberculin test. In the latter group an endeavor is made to examine all members of the family to determine if possible the original source of infection.

The polyclinic feature of the dispensary gives each patient who will follow advice, the opportunity of a complete diagnosis. Private practitioners may refer their cases for diagnosis, and on its completion a full report is made. If a dispensary case is found to be permanently under the care of a private practitioner, the physician is sent a complete résumé of our findings and recommendations.

The director of the Bureau of Tuberculosis is also available for consultation service with practitioners.

Other important clinical adjuncts are our X-ray service and free tuberculin.

The X-ray service is an arrangement with 4 prominent roentgenologists to take stereo films for a minimum of \$5 per pair, the patient paying \$3, and the Department of Health the balance. The only qualification is that patients recommended for this service shall be unable to pay standard fees, and be under the care of a practitioner. It is left to the doctor to decide. Duplicate reports are made on these films, one going to the doctor and the other to this bureau, which offers a basis for checking on diagnosed cases. The service has been in operation over 4 years and averages over 100 films a year.

Fresh dilutions of O. T. are prepared by our laboratory and supplied to physicians on request, free of charge. Physicians have been urged to use O. T. for all child contacts in families where a definite diagnosis has been made. It has not been used to its fullest capacity.

#### NURSING SERVICE

All of our nursing service is rendered by the New Haven Visiting Nurse Association on a generalized plan. They maintain a tuberculosis supervisor who is responsible for the tuberculosis nursing service in the various districts. Measured by A. P. H. A. standards, the Association has consistently given over 200 per cent of accepted standards in visits. We do not feel, however, that this service is overdone.

It was obvious from the outset that the generalized plan needed more emphasis on tuberculosis than was customary in such services; so a series of lectures on tuberculosis, beginning with a historical sketch, to the immediate problem in New Haven, was arranged for the entire staff. The lectures, 8 in all, were given by clinicians from the dispensary and sanatoria, and the director of the bureau, giving the nurses an opportunity of knowing the majority of the tuberculosis workers

handling their cases. They also spend time at the dispensary, at William Wirt Winchester Hospital (tuberculosis hospital), and visit one or more of the state sanatoria to familiarize themselves with the problem. New nurses added to the staff since that time have been given similar courses in groups.

This effort has been most productive in a broader appreciation of the problem on the part of the nurse and consequently a better service to the patient.

#### INSTITUTIONAL CARE

The Tuberculosis Commission, created by State Statute, is responsible for all sanatorium hospitalization in Connecticut. They operate 5 institutions with a total bed capacity of 1,222 (Sept., 1932). To this may be added 481 beds in other state, private, or semi-private institutions, a total of 1,703 beds. Connecticut reported an average of 932 deaths from tuberculosis (all forms) in the past 3 years—thus we have a ratio of 1.82 beds per annual death.

The state has opened 450 new beds between June and September, 1932. Previously the waiting lists ran as high as 450 for many months, meaning a waiting time of from 4 to 6 months. This proved to be a very serious hazard from the standpoint of public health and cure of the patient. The Department of Health secured an appropriation from the Board of Finance of New Haven to provide temporary hospitalization in local hospitals while patients were awaiting sanatorium vacancies. This service was administered by the director of the bureau and only those cases were taken who could not afford to pay the local charges of \$15 to \$21 per week, and that were deemed a menace in the home or to the community. In the majority of cases the department has to assume full responsibility. The total expenditures for this service from 1927 to September,

1932, were \$79,191.53. It is not the policy of the bureau to render this service, except in emergencies, if there are available vacancies in any of the state sanatoria.

The cost of care in state sanatoria is about \$24 per week, \$4 of which must be paid either by the patient, some agency, or the town in which he has a legal settlement. Thus in New Haven, the Department of Charities and Corrections assumes the \$4 minimum charge for state care in the cases of those unable to pay. A large number secure this basic cost by membership in the Employees' Tuberculosis Relief Association.

Despite the long waiting lists at our state sanatoria, New Haven has been able to provide hospital care for those who will coöperate. The one exception is the recalcitrant case, and we have been handicapped there in not having a hospital with commitment authority, but we have utilized the county jail in a few instances with good results. The problem requires additional sanatoria with restraining facilities with commitment to make it workable.

During the past 4 years we have maintained an average of 2 or more patients in hospitals and sanatoria for each annual death, and our performance in this item has been over 200 per cent of the quota established by the A. P. H. A. standards.

Additional institutional care for the tuberculous in New Haven is to be found in open window classrooms and a summer camp. The open window classrooms are operated entirely by the Department of Education. There are 7 in operation, with an enrollment of over 300 each year. Special consideration is given to contact children recommended by this bureau and the dispensary. A camp is operated 3 months each summer and it is in all respects comparable to a preventorium. The children are selected at the dis-



pensary; all have positive tuberculin tests; and the majority, some form of manifest glandular, a latent pulmonary, or childhood type disease. No child with open pulmonary disease is admitted. The camp reaches over 100 worthy children each year and is free.

The Employees' Tuberculosis Relief Association assumes a very active part in the New Haven program. It is a voluntary organization designed for the employees of industries in New Haven. Its income is derived from contributions from employees in some 50 or more industries, the industries themselves, and the sale of Christmas seals. The primary purpose of the Association is to pay the basic \$4 required by the state sanatoria, or a similar amount in other institutions. Their services are predominantly for relief and amount to about \$30,000 a year. They save the city about \$18,000 a year in sanatorium costs.

#### SPECIAL ACTIVITIES

Plans for the examination of school children by the use of tuberculin and X-ray have been under consideration for several years, but for financial reasons only a limited program was started in 1931. We were anxious to determine as nearly as possible the extent of the problem and the reaction of parents and children. Accordingly, we selected a single school<sup>3</sup> and without excessive effort we received requests for tuberculin tests in 84 per cent of the enrollment, a figure that could easily have been exceeded if we had canvassed the homes. Thirty-eight per cent of those tested (563) reacted to the test; of the 215 X-rayed 53 showed evidence of disease, 18 were suspicious, and the remainder showed no disease. Thus the demand for this type of service was established.

This year a new plan is under way. We believe that the most potent source of new cases is to be found in our

junior high and high schools. We propose to drop the tuberculin test and use the new paper sensitized X-rays which can possibly be secured in mass quantities at about \$.60 a single film. This amount is so small that we feel there will be at least 50 per cent, or 5,000, in our junior high and high schools who can pay for it themselves.

#### BUDGET OF THE BUREAU OF TUBERCULOSIS

Our budget is made up of 4 chief items:

Salaries  
Education, equipment and supplies  
X-ray service  
Hospitalization

The total money appropriated and expended since 1926 is shown in Table I.

TABLE I

Year	Appropriation	Expended	Per Capita Cost
1926	\$5,250.00	\$4,229.00	\$.026
1927	6,866.00	5,915.00	.036
1928	10,600.00	17,993.08	.110
1929	25,650.00	24,351.00	.149
1930	25,650.00	28,688.47	.176
1931	28,750.00	34,641.39	.212
1932	25,700.00	.....	....

Bureau started September, 1926.

The increase in expenditures over appropriations is accounted for in the item of hospitalization made necessary by the urgent need of placing cases that were a menace in their homes or the community. The decrease of expenditures in 1929 under appropriation was due to our failure to use the entire amount available for temporary hospital care.

#### REFERENCES

1. Edwards, H. R. Tuberculosis Program in New Haven. *Am. Rev. Tuberc.*, 21:2 (Feb.), 1930.
2. Edwards, H. R. Tuberculosis Dispensary Practice in New Haven (to be published in *Am. Rev. Tuberc.*).
3. Edwards, H. R. Evidence of Tuberculous Infection in Prince Street School—Health, *Month. Bull.*, New Haven Dept. of Health, 58, 8 (Aug.), 1931.

# Replacement of Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage\*

WILLIAM H. PARK, M.D., F.A.P.H.A.

*Bureau of Laboratories, Department of Health, New York, N. Y.*

LET us first consider to what extent a negative Schick test gives us a measure of the degree of antitoxic immunity of a child. Although we certainly know better, we are apt to think that a negative Schick test in a child indicates a high degree of immunity. Of course, it simply indicates that the child has at least 1/30th of a unit of antitoxin in 1 c.c. of its blood. This is sufficient to prevent infection; a greater amount might insure a longer average immunity. As the tissues of the majority of children are readily stimulated to make this amount of antitoxin, a single injection of 1 c.c. of toxin-antitoxin or of 2 antigenic units of toxoid will make about 40 per cent of them Schick negative. A repetition of the same amount will increase the percentage of those changing to a negative test to about 70 per cent; and a third injection to about 85 per cent. The actual amount of antitoxin in the blood can only be estimated by testing specimens of the blood for their power to neutralize a definite amount of toxin in guinea pigs. These tests are tedious but not difficult to carry out.

*The relative immunizing value of toxoid and toxin-antitoxin*—The results

of a number of tests are given in Table I.

TABLE I  
COMPARATIVE IMMUNIZING VALUE OF TOXOID  
AND TOXIN-ANTITOXIN IN GUINEA PIGS

Substance	First Injection Original Amount in c.c.	Second Injection	Total Antigenic Units	No M.L.D. Neutralized at end of 2 mos.
Toxoid	.0625		0.6	3.0
Toxin-antitoxin	.0625		Not Tested	1.5
Toxoid	.125		1.25	7.5
Toxin-antitoxin	.125		Not Tested	1.5
Toxoid	.250		2.5	20.0
Toxin-antitoxin	.250		Not Tested	2.5
Toxoid	.062	.062	1.25	10.0
Toxin-antitoxin	.062	.062	Not Tested	3.0
Toxoid	.125	.125	2.50	40.0
Toxin-antitoxin	.125	.125	Not Tested	4.0

It is evident that while the toxin-antitoxin injections produced immunity, the degree of immunity was much less than in the guinea pigs getting the injections of equivalent amounts of toxoid. This was especially true when 2 injections were given. The increase in the amount of immunity produced is almost proportional to the amount of modified toxin and the number of doses given. The potency tests were made 6 weeks after the giving of the first injection.

*The most suitable size of the injections*—In children of less than 3 years of age, good preparations of toxoid create little disturbance when 1 c.c. is injected. This amount should contain

\* Read at a Special Session on Diphtheria Prevention of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

TABLE II

THE IMMUNIZING EFFECT OF DIFFERENT SIZED INJECTIONS OF DIPHTHERIA TOXOID

Number Injections	c.c.	Antigenic Units	Age of Children	Number of Children	Schick Retests Neg.	Pos.	Per Cent Immune
2	0.12	2.5	6 mos.-5 yrs.	90	82	8	91
3	0.12	3.75	" "	118	109	9	92
2	0.5	10.00	" "	496	468	28	94
3	0.5	15.00	" "	71	67	4	94
3	0.5	15.00	5-15 yrs	243	228	15	94
2	1.0	20.00	6 mos.-5 yrs.	210	204	6	97

The retests were made between 2 and 3 months after the first injection.

at least 10 antigenic units. In young people and in adults, the reaction from this amount is occasionally rather severe. About 4 per cent show a painful local swelling and some constitutional symptoms. These reactions are not in the least harmful, but they are annoying and sometimes create opposition to further treatments. When 1 c.c. is mentioned as a dose, we always mean of a standard toxoid, having about 8 to 10 antigenic units. It is a pity that the authorities do not require the number of antigenic units in 1 c.c. to be stated. Without the knowledge of the number of antigenic units the amount of fluid is meaningless. One might as well state that a Schick test was made with 1/10 c.c. of dilute toxin, instead of stating it was 1/50 m.l.d.

Toxoid is such a good immunizing substance that much less than 2 injections of 10 antigenic units each will suffice to produce a greater percentage of immune children than 3 doses of 1 c.c. of toxin-antitoxin.

Table II gives the results of injecting from 2/10 c.c. to 1 c.c. of a toxoid containing 10 antigenic units per c.c. In some children, 2 injections were given; and in some, 3.

It is noted that 2 injections, each containing only 2.5 antigenic units, changed the reaction in the children in 91 per cent of the cases. When the size of the injection was multiplied 8 times,

the percentage of children who developed enough antitoxin in their bodies to alter the Schick reaction was only moderately greater, because a small percentage of the children is always much more resistant than the majority. The average amount of antitoxin in them was markedly increased. As the toxoid causes no inconvenience in young children, it would seem wise to inject 10 antigenic units in each of 2 doses. There is a probability that in time we will have a preparation so active that one dose will be effective.

*The age of the children at which injections produce the best results—*Babies under 2 months old did not respond as well as those of older ages to the injections. Those between 3 and 6 months responded as well as those of greater age. I believe, however, that if larger numbers had been tested, the percentage of success would not have been quite so great.

TABLE III

THE IMMUNIZING EFFECTS OF INJECTIONS OF DIPHTHERIA TOXOID IN CHILDREN OF DIFFERENT AGES

Children Age	Number	Result of Retest Per Cent.*		
		Negative	Positive	Immune
1- 2 mos.	46	34	12	74
3- 6 mos.	50	48	2	96
7-12 mos.	388	359	29	92.5
2nd year	316	304	12	96
2-4 yrs.	247	240	7	97
4-6 yrs.	193	187	6	96.8

\* These retests were made between 2 and 3 months after the first injection.

Table III gives some recent figures by my associates, Dr. May Schroder and Dr. Julius Blum.

It is evident that we can choose any month after the end of the second, but because of their tender age we will probably be wise to immunize the infants living in the country at the age of 6 months, since many of them are not immune; while in the city, 9 months will probably be the best choice, since 80 per cent to 90 per cent of the infants are immune because of their mothers' transferred immunity. This immunity is retained for from 7 to 12 months.

*The interval between injections of doses of toxoid*—We have given repeated doses to several thousand children. The intervals between the doses varied. The percentage of successful results conferred in children receiving injections at intervals of 1 week was somewhat less than that obtained at intervals of 2 weeks. Intervals of longer than 2 weeks between injections gave no better results. It seems, therefore, that when possible intervals of 2 weeks or longer should be preferred.

*Effect of the addition of alum to the toxoid preparations*—There is no doubt that the addition of 0.2 per cent of alum adds considerably to the efficiency of the toxoid preparations. This is probably due to the fact that the presence of alum in the solution of toxoid delays somewhat the rapid dispersion of the toxoid in the tissues. With a greater percentage of alum the toxoid is precipitated. This precipitate

when injected subcutaneously is slowly absorbed. Good results are claimed.

#### CONCLUSIONS

1. The manufacturers should be required to state on their labels the number of flocculation (antigenic) units in the amount in the syringe or vial, or the number of units per c.c.

2. Two doses of from 5 to 10 antigenic units each are sufficient to immunize from 90 per cent to 98 per cent of young children, and of a somewhat less percentage of older children. Even 2 doses of 2.5 units each will give us as much immunity as 3 doses of 1 c.c. of standard toxin-antitoxin. If by refining we are able to obtain a much stronger toxin which does not produce too much local irritation we may use one dose only.

3. Toxoid has an advantage over toxin-antitoxin in being much more stable.

4. An interval of 2 weeks, or longer, is advisable between injections, but where it is much more convenient to make the interval only a week it is proper to do so.

5. At any age after 3 months, infants respond well to injections of toxoid. The choice time in the country is probably at 6 months, or a little later; and in the city, 9 months or a little earlier. The difference in the most desirable age is due to the fact that in the country a smaller percentage of infants obtain passive immunity from the mothers than in the city.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

CLARENCE L. SCAMMAN, M.D.

ARTHUR P. MILLER, C.E.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## AIR CONDITIONING AND VENTILATION

A RECENT issue of the *Public Health Reports*<sup>1</sup> calls our attention to the modern air conditioning system of ventilation employed in the Senate and the House Chambers of the Capitol at Washington, D. C. This article presents to the public health worker developments of a new science in his field—a science that has stirred the public imagination and shows much promise in its widespread application.

Air conditioning was evolved in response to the demands of industry, in an effort to overcome the influence of certain deleterious climatic conditions on the manufacture of weather-sensitive products. In recent years the science has been given added impetus by a new demand for its application in the field of ventilation for human comfort and efficiency, and we have witnessed the rapid growth of this new application of ventilation, as attested by the numerous installations in theaters, office buildings, trains; in fact, wherever people tend to congregate in large numbers. So much progress has been made in the development of equipment used in air conditioning that today we even find small units on the market for use in residences.

Our understanding of the basic principles of ventilation and the physiological responses of the human body to various atmospheric conditions has been greatly increased by the work of Professor Yaglou and his associates, in the establishment of the effective temperature scale and the winter and summer comfort charts. Although no single comfort standard can be prescribed to meet every need, we are in a position, as a result of recent research, to produce an indoor climate exerting a beneficial influence on our comfort and efficiency. Professor Huntington regards a certain type of climate as one of the essentials conducive to great progress. Such a climate need not necessarily be a pleasant one, such as prevails

in some of the sub-tropical regions of the earth, but should be one with stimulating qualities.

There is still a lack of agreement among students in this field as to what constitutes an ideal climate. We also lack sufficient conclusive data to indicate that certain air conditions optimum for comfort are identical with those for health, although on a general physiological basis the two are closely allied. The human body is capable of adapting itself to all sorts of atmospheric conditions; nevertheless, this adaptability is attained at the expense of creative and physical energy. Voluminous data have been gathered which indicate that there are optimum air conditions for comfort and that our ability to do work is greatly influenced by the state of the atmosphere.

However, many vexing problems confront the student of air conditioning in the field of ventilation for comfort. The optimum range of humidity is still a matter of conjecture, but all investigations on this subject indicate that this factor must be considered in conjunction with temperature.

Another problem to be solved is that of reproducing the natural climatic state of the atmosphere existing in an open country under ideal weather conditions. The secret of the stimulating quality of country air which is lost when the air enters indoors, especially when it is mechanically treated, has as yet not been disclosed. Ionization and ultra-violet light have been suggested as possibilities, and considerable work is now in progress on this question. The factor of environmental radiation has also been shown to be one of importance in the field of ventilation and is now receiving attention both in this country and abroad.

It is only hoped that research on the subject of air conditioning will not experience a lag at this time of our economic crisis, for it is only by a continuation of the excellent type of work already accomplished that we may hope to broaden our knowledge of this interesting and important phase of hygiene.

#### REFERENCE

1. Greenburg, Leonard, and Bloomfield, J. J. The New Ventilating Systems of the Senate and House Chambers of the Capitol, Washington, D. C. *Pub. Health Rep.*, 48, 6 (Feb. 10) 1933.

## MILK AND MEAT INSPECTION IN THE UNITED STATES

THE American Veterinary Medical Association has for some years maintained a committee to study meat and milk inspection in the various states in the Union. At the last meeting a report<sup>1</sup> was made by Dr. Cary, the chairman, which is anything but encouraging. He explained that for 2 years he had been trying to get reports from the states as well as from a number of the cities. In many cases he wrote to 4 or even more men in a single state, and frequently got reports which were in conflict on many points. It was impossible for him to arrive at an accurate conclusion as to the status of meat and milk inspection in such cases.

He gives condensed reports from 42 states. In going over them, we are at once struck by the lack of systematized inspection, particularly of meat, but also of milk. We are no less struck by the difference in the laws of the various states and in the authorities which are made responsible for one or the other inspection, or for both—the state board of health, the state department of agriculture, the state department of public welfare, the bureau of sanitary engineering,

which is often under the state department of health, the state board of live stock commissioners, the bureau of animal industry.

In some, inspections are done to a certain extent by graduate veterinarians, and in some almost entirely by laymen. This is especially the case with milk. In one state it was considered that veterinarians are not well qualified as milk inspectors, and that the best work is done by chemists and bacteriologists. In others, so-called dairy specialists are employed, and in still others, a certain number of physicians do the work, or as much of it as is done. Some states have the same inspectors for both meat and milk, but the majority of them have different operators. In a number there is no state-wide law for either meat or milk inspection. Others have inspection for meat, but none for milk, or *vice versa*, though apparently those having some laws regarding milk inspection are in the majority. In almost all states, the cities are ahead of the state itself in inspection of milk, but it is rather astonishing to see how many states have neglected inspection. Even some which are in many respects more advanced than most are woefully deficient in the work done. For example, in Pennsylvania, the meat inspection law is administered by the Bureau of Animal Industry, but only 6 men are employed for the work, each having a district including from 8 to 13 counties. In this state there are some 3,000 slaughter houses, many of them small, but it is easy to see that 6 men cannot adequately do the work.

Under our system of government, the federal authorities have no right to do any intrastate work except on the invitation or permission of the local authorities and, needless to say, little is done. The report holds that we have the best meat inspection system in the world, and with this opinion we agree, but the inspection is necessarily legally limited to interstate and export work. In addition to the many small slaughter houses, a very large number of animals are slaughtered on the farm and sold without inspection of any sort. The report was "accepted" by the Association on the authority of the chairman and as his progress report.

As far as the inspection of milk goes, this is very largely left to local communities. Most cities have some sort of milk inspection. Some states have state-wide laws, but they are not enforced. Indeed, few if any states have a sufficient force of men to carry out proper milk inspection for all cities and towns, even if they wished to do so.

As is known, the U. S. Public Health Service began the development of what was then called the "Standard" Ordinance in 1923 and, in one way or another, the adoption of this has been widely urged on communities over the country. A survey has recently been made by an Englishman<sup>2</sup> for the Health Section of the League of Nations, who correctly says that this ordinance has met and is still meeting strong opposition. It points out that the reports are open to bias, and that since the surveys made have been carried out under the federal government, and the method of assessment was such as to favor cities working under the ordinance, too much weight cannot be attached to the findings. The author of this report recognizes that under our governmental system the Service has no authority to force the ordinance on any state or city, and since its application demands greater financial expenditures, higher standards of vigilance, activity, and mental honesty than are to be found in many towns, there is little likelihood of its uniform adoption in the near future.

We can safely say in conclusion that while conditions have improved tremendously over what they were even 10 years ago, and while we believe that they are still improving, much is left to be desired. With the exception of our federal

service, our inspection of slaughter houses, as well as of meat and milk, in practically every part of the United States is in a condition of flux. It is hard to suggest a remedy other than intensive and extensive education, but according to the report before the Veterinary Medical Association, only a limited number of schools are giving really worthwhile instruction in these matters. The same can also be said of medical colleges without much fear of contradiction. The public must be educated to demand these things and trained to realize that expenditures along these lines are investments for safety which may be regarded as the best form of life insurance.

## REFERENCES

1. Cary, Dr. C. A. *J. Am. Vet. Med. Assn.*, Mar., 1933, p. 355.
2. Wilson, Dr. G. S. *Quart. Bull. Health Organisation*, Dec., 1932, p. 664.

## EATING UTENSILS AS A SOURCE OF INFECTION

IN the prevention of disease we often make the mistake of looking too far away for the source and neglecting everyday affairs directly at hand. For some years certain companies and certain cities have insisted upon the physical and bacteriological examination of food handlers. Unquestionably many sources of infection have thus been eliminated.

Attention has also been directed to the sterilization of eating utensils.<sup>1</sup> In some cases these are washed clean but infected later by the handlers. A striking example of this was the epidemic of typhoid fever<sup>2</sup> among university students at Madison, Wis., in which a waiter who suffered from a walking case of typhoid fever, wiped and stacked dishes after they had been washed, and infected some 41 persons. He finally died, after suffering severe headache for some 3 weeks, for which he consulted an optician.

In New York City an investigation of 1,980 food handlers in 1917 showed 10 active and 15 arrested or suspected cases of tuberculosis, 19 active and 32 suspected cases of syphilis, and 6 of gonorrhea. Other examinations have revealed similar conditions, and it seems not only possible but probable that patrons of restaurants have been infected through such means. It is said that in certain establishments where soft drinks and ice cream are served, glasses and spoons have nothing which can be called washing, but are simply rinsed, drained, and used again sometimes without drying. Even in high-class restaurants finger bowls are used over and over by different patrons without even being rinsed in between. The single service paper cups and finger bowls have done a good deal to rectify such conditions, but there is still much to be desired.

The mechanical dish washer is coming into more or less general use in hotels and restaurants, and bacteriological examinations show that the results are much better than hand washing, except in those cases where the latter is done with extreme care, with really hot water and soap, and with clean and hot rinse water. When the rinse water is only lukewarm, there is absence of disinfecting action, and in a short time, becomes rich in bacteria. With hand washing the tendency, of course, is to use water which is not hot enough to scald the operator.

The examination of restaurant apparatus referred to was carried on in Montreal, and showed that rinse water at temperatures from 37° to 47° C. contained members of the colon-aerogenes group. As the temperature of the water was increased, the number of bacteria diminished, but even at 55° C., a certain



number of bacteria persisted, though none of the colon group were found. On the other hand, when utensils were cleansed and sterilized by boiling water, the total counts were very low, and members of the colon-aerogenes group were absent. Further experiments showed that properly conducted machine washing gave better results when the utensils were dried in the air than when a towel was used. The total obtained from the examination of 6 types of tableware dried in the air were 34 bacteria for air and 327 for towel drying. Similar results were obtained in homes and clubs, and advantage being markedly in favor of air drying.

Bacteria are transmitted to eating utensils by handlers, and the types are largely determined by whether or not these handlers are infected with some contagious disease. They may be in the nasal secretions and saliva, and be coughed or sneezed on to utensils, especially those like cups, spoons and forks, which also come into direct contact with the mouth. The whole study emphasizes that there is undoubted evidence of the transmission of certain communicable diseases through the medium of improperly cleansed and disinfected eating utensils, both in private homes and in public eating places. There is good reason to believe that the conditions in Montreal are not unlike those elsewhere, and may be accepted as representative. The sanitary arrangements in many hotels and restaurants are much below the accepted standards for cleanliness and safety. Mechanical dish washing is better than any method of hand washing. There should be a better inspection of eating places.

## REFERENCES

1. *Canad. Pub. Health J.*, Feb. 1933, p. 83.
2. *J. A. M. A.*, May 22, 1909, p. 1635.

## THE SIXTY-SECOND ANNUAL MEETING INDIANAPOLIS, OCTOBER 9-12

**A** GLANCE through the preliminary program of the scientific sessions of our Sixty-second Annual Meeting illustrates again that there is no diminution of study and research in times of depression, nor any reduction in the quality or quantity of scientific writing.

The program follows the traditional pattern of breakfast, morning, luncheon, dinner, afternoon, and evening meetings, beginning Monday morning, October 9, and continuing through Thursday, October 12.

The successful Health Education Institute held at Washington for the first time will be repeated this year, the theme of five sessions being "The Psychology of Health Education." Attendance is to be definitely limited to 60.

We have become accustomed to the presence of a number of related associations and groups at our meetings. This year we shall have many old and some new friends with us. The old ones include the American Association of School Physicians, the Conference of State Sanitary Engineers, the Conference of State Laboratory Directors, the Association of Women in Public Health, the American Social Hygiene Association, the International Association of Medical Health Officers. The International Association of Dairy and Milk Inspectors were missed at Washington, and we can expect them in the future only in alternate years. This year they return to us again; attending the Laboratory session on Thursday morning, participating in a joint meeting with the Food and Nutrition Section on Thursday afternoon, and beginning their own independent meetings on Friday.

The Indiana State Nurses Association and the Indiana League of Nursing Education, new to us, will meet with our Public Health Nursing Section on Thursday afternoon and continue with their individual sessions Friday.

The American Social Hygiene Association is building a joint program with the Child Hygiene Section for Thursday morning and will conduct a Regional Conference for a day and a half thereafter.

The ten sections of the American Public Health Association have already prepared material for 42 sessions, and the end is not yet in sight. The keynote of the meeting appears to be one of intense practicality. The titles of the papers and reports indicate the brass-tack thinking that health workers these days necessarily must do.

Members of the Association are urged to make their hotel reservations early. The July *Journal* will publish hotel rates, railroad rates and further program details.

*Sixty-second Annual Meeting of the American Public Health  
Association, Indianapolis, Ind., October 9-12, 1933,  
Headquarters, Claypool Hotel*

# ASSOCIATION NEWS

## INDIANAPOLIS LOCAL COMMITTEE

### EXECUTIVE COMMITTEE

*General Chairman*—William F. King, M.D.

*Vice Chairman*—Walter F. Kelly, M.D., President, Marion County Medical Society

John H. Hare, M.D., State Health Commissioner

H. E. Barnard, Ph.D., Director, Corn Industries Research Foundation

Harry Jordan, Indianapolis Water Company

H. G. Morgan, M.D., City Health Officer, Indianapolis

Thomas A. Hendricks, Executive Secretary, State Medical Society

John S. Wright, Eli Lilly & Company

Henry T. Davis, Director, Indianapolis Convention and Publicity Bureau

M. A. Auerbach, Executive Secretary, State Tuberculosis Association

Thurman B. Rice, M.D., Indiana University School of Medicine

### SUB-COMMITTEE CHAIRMEN

*Finance Committee*—H. E. Barnard, Ph.D., Director, Corn Industries Research Foundation

*Entertainment Committee*—M. A. Auerbach, Executive Secretary, State Tuberculosis Association

*Publicity Committee*—Thomas A. Hendricks, Executive Secretary, State Medical Society

*Registration and Information Committee*—Henry T. Davis, Director, Indianapolis Convention and Publicity Bureau

*Ladies Entertainment*—Mrs. William S. Tomlin, President, Auxiliary Marion County Medical Society

*Sectional Meetings Committee*—H. G. Morgan, M.D., City Health Officer

### SUB-COMMITTEE ON SECTIONAL MEETINGS

*Conference of State Sanitary Engineers*—Louis A. Guepel, State Sanitary Engineer

*Public Health Nurses*—Eva F. MacDougall, R.N., State Board of Health

*Association of Women in Public Health*—President, Ada E. Schweitzer, M.D.

*International Association of Dairy and Milk Inspectors*—Frank C. Wilson, State Board of Health

*American Association of School Physicians*—Thurman B. Rice, M.D., Indiana University School of Medicine

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

#### *Health Officers Section*

E. A. Barette, M.D., D.P.H., Edifice "La Tribune," Sherbrooke, P. Que., Canada, District Health Medical Officer

Jos. F. X. Bosse, M.D., Gaspé, P. Que., Canada, Medical Officer of Gaspé-East County Health Unit

Austin Cantin, M.D., New-Carlisle, Bonaventure County, P. Que., Canada, Medical Officer in Health Unit

Louis-Avila Chabot, M.D., 325 East St. Joseph Blvd., Montreal, P. Que., Canada, District Medical Health Inspector

Jules Constantin, M.D., D.P.H., Roberval,

Roberval County, P. Que., Canada, District Inspector

Adelard Corsin, D.P.H., 4434 rue St. Andre, Montreal, P. Que., Canada, Regional Inspector, Service Provincial d'Hygiene

Edgar Couillard, M.D., D.P.H., 64 Ste. Ursule, Quebec City, P. Que., Canada, Inspector, Public Health District No. 1

Dr. R. Deschenes, Ste Anne des Monts, County Gaspe, P. Que., Canada, Health Officer, Gaspe County Health Unit

Omer E. Desjardins, M.D., 1293 Hart St., Three Rivers, P. Que., Canada, Provincial Health Inspector

Jos. de Varennes, M.D., 109 Cartier, Quebec City, P. Que., Canada, Medical Inspector, Public Health District No. 2

Jean-Louis Faille, D.P.H., County Arthabaska, Victoriaville, P. Que., Canada, Inspector, Provincial Bureau of Health

Andre Gallant, M.D., Havre Aubert, Iles de la Madeleine, P. Que., Canada, Sub-District Health Inspector

Charles A. Gauthier, M.D., Cap-de-la-Madeleine, P. Que., Canada, Medical Officer, County Champlain Health Unit

Jean Gregoire, D.P.H., Provincial Bureau of Health, Parliament Bldgs., Quebec, P. Que., Canada, Inspector of County Health Units

Dr. Joseph-Leon Houde, Rimouski, County Rimouski, P. Que., Canada, District Health Officer, Provincial Bureau of Health

Andronique Lafond, M.D., D.P.H., Parisville, Lotbiniere County, P. Que., Canada, Sanitary Inspector

Aquila Lapierre, M.D., D.P.H., 772A Bloomfield, Montreal, P. Que., Canada, District Health Inspector, Provincial Bureau of Health

Joseph Rosario La Rose, M.D., Matane, Matane County, P. Que., Canada, Medical Officer, County Health Unit

Joseph E. Masson, M.D., D.P.H., 847 Dunlop Ave., Montreal, P. Que., Canada, Regional Inspector, Provincial Bureau of Health

E. Ouellette, D.P.H., St. Charles, Bellechasse County, P. Que., Canada, Medical Hygienist for Montmagny and Bellechasse Counties

Henri Sanson, M.D., D.P.H., 109 Laframboise St., St. Hyacinthe, P. Que., Canada, Inspector, Provincial Bureau of Health

J. Ernest Sylvestre, M.D., D.P.H., 2 Cote du Passage, Levis, P. Que., Canada, Medical Officer, County Health Unit

Louis-Philippe Thiboutot, M.D., D.P.H., County Labelle, Mont-Laurier, P. Que., Canada, Medical Hygienist, Labelle County Health Unit

James E. Thomas, M.D., D.P.H., 148 Quinn Blvd., Longueuil, P. Que., Canada, Regional Inspector, Provincial Bureau of Health

William H. Wakelee, Southbury Conn., Town Health Officer

#### *Laboratory Section*

Orren D. Chapman, M.D., 610 E. Fayette St., Syracuse, N. Y., Associate Professor of Bacteriology, Syracuse University

G. Howard Gowen, M.D., 710 S. Lincoln St., Chicago, Ill., Professor of Bacteriology and Public Health, Chicago Medical School

Samuel V. Ramsey, D.V.M., 234 S. Third St., Terre Haute, Ind., Food Inspector

John F. von der Lieth, Ph.B., 921 Bergen Ave., Jersey City, N. J., Director, Hudson County Board of Health Laboratory

#### *Industrial Hygiene Section*

Anna M. Baetjer, D.Sc., 615 N. Wolfe St., Baltimore, Md., Associate in Physiological Hygiene, Johns Hopkins School of Hygiene and Public Health

#### *Food and Nutrition Section*

Willes B. Combs, M.A., University Farm, St. Paul, Minn., Professor, Dairy Husbandry

Joseph S. Gavin, B.Sc., 200 Stockbridge Ave., Buffalo, N. Y., Gavin Dairy Laboratory.

J. J. Schmidt, French-Bauer, Inc., Cincinnati, O. (Assoc.)

#### *Public Health Education Section*

Dr. Horacio Abascal, Ave. 10 de Octubre 543, Habana, Cuba, Secretary, Commission for the Study of the Leper

Louis C. Kress, M.D., 113 High St., Buffalo, N. Y., Assistant Director, Division of Cancer Control, State Department of Health

William O. McDermott, M.D., 7 Daly Bldg., Casper, Wyo., County Health Officer

#### *Epidemiology Section*

Theode Saint-Martin, M.D., D.P.H., Amos, County Abitibi, P. Que., Canada, Medical Inspector, Provincial Bureau of Health

Lutius E. Smith, M.D., 439 Fairlawn Rd., Louisville, Ky., Executive Secretary, Kentucky Tuberculosis Association

## PUBLIC HEALTH ADMINISTRATION

Racine, Wis.—For this city of 69,333 individuals, the Health Commissioner has prepared a mimeographed report of 47 pages, the usefulness of which is materially enhanced by a generous index. The Racine Health Department has 47 on its pay roll, of which 21 are employed by the Health Department itself, 9 in the Lincoln Hospital, and 17 in the Garbage Collection and Incineration Divisions.

The death rate in 1932 was 7.9 per 1,000 which is the lowest ever recorded in this city. The splendid activities for health promotion and the special effort to prevent diphtheria has been continued in keeping with the policy of previous years. There were 17 cases of diphtheria reported, the lowest number in over 20 years. There were 2 deaths from this cause, 1 occurring in a young woman who was brought to the City Hospital for treatment and died within a few hours of admission. In neither instance had the individual received any preventive treatment. There was no case of smallpox in 1932 which proved, however, to be a measles year with 2,648 cases and with but 1 death.

Milwaukee, Wis.—As a city of good health, Milwaukee has maintained its splendid record and distinction. In 1931 this community was again awarded first place in its population group for cities participating in the National Inter-Chamber Health Conservation Contest. During the 3 years of the Contest, Milwaukee has been awarded first place on 2 occasions. A new low death rate of 8.8 was recorded in 1932. The Health Commissioner reports that the average age at death is now 52.6 years. He com-

pares this present figure with the average age of death in 1880 which was 18.1 years, in 1900 when it was 27.6 years, and in 1920 when it had reached 38.7 years. A low infant death rate of 46 per 1,000 births is reported for 1932, a year in which there was not a single death from typhoid fever. The diphtheria prevention program has been continued, through special emphasis in Child Welfare Clinics and by utilizing a portable bus clinic.

Smallpox Incidence—The U. S. Public Health Service in its *News Letter* for April 18, reports a very noticeable decrease in the incidence of smallpox in the United States during the past 2 years. The number of cases reported in 1930 was 48,907; in 1931 there were 30,232 cases and in 1932 only 11,168. The number of cases for 1932 represents but 27.8 per cent of the average for the preceding 4 years. For the first 13 weeks of 1933 there were reported 2,413 cases compared with 5,280 cases for the same period in 1932.

English Health Insurance—In 1908 the report of the Royal Commission on the Poor Law appeared and, like the recent report of the Committee on Costs of Medical Care, it contained a majority and a minority report, both of which agreed in that medical service to the poor people was most unsatisfactory and that something ought to be done about it. The majority recommended the establishment of a system of poor dispensary while the minority recommended the extension of the work of public health authorities. The English government, however, adopted

neither recommendation but introduced a plan of compulsory health insurance.

This plan, which became effective in 1912, involves two basic principles: first, that private insurance medical practice should resemble private medical practice as far as possible; and second, that the scheme should provide each insured person with the services of a family physician. At present there are 15,000 insurance physicians in England and Wales who are serving 15,000,000 insured persons.—George F. McCleary, English Health Insurance and the Standard of Medical Service, *Quart. Bull.*, Milbank Memorial Fund, Apr., 1933.

**Epidemic of Typhoid Fever in Chamberlain, S. D.**—An epidemic of 285 cases of typhoid fever occurred in Chamberlain, S. D., in the winter of 1932-1933. There were 31 deaths, giving a little over 10 per cent fatality rate. Chamberlain is a town of 1,300 people, situated on the bank of the Missouri River. This epidemic was undoubtedly due to the use of raw river water which had been insufficiently chlorinated. The water is taken from the Missouri River through an intake located about 150 ft. from the bank and flows by gravity into cisterns located under the pumphouse. The water is then pumped to a settling basin, the effluent then being chlorinated and pumped into the service mains. The water is not filtered. This procedure is followed except for a few months in the winter when the settling basin freezes up, in which case the raw river water is chlorinated and pumped directly into the mains. Shortly before the outbreak the settling basin was cut off and only chlorinated raw water was furnished the city. The Missouri River contains such a large amount of silt and organic matter that it is difficult to maintain the proper residual chlorine to render the polluted water potable. The

amount of chlorine which was being added previous to the epidemic was so small that it had little effect on the potability of the water.

At the beginning of the epidemic Dr. A. E. Bostrum, Epidemiologist, W. W. Towne, Sanitary Engineer, and the Assistant Director of the laboratory of the State Board of Health, went to Chamberlain to investigate and take charge of the epidemic. A temporary laboratory was set up to make diagnoses, check water and milk supplies, release patients, and to carry on such research as was indicated in an attempt to locate the exact source of contagion.

The water supply was rendered safe by the addition of large quantities of chlorine so as to maintain a high residual. It was determined that this high residual was necessary to maintain a potable water. Changes were made in the settling basin so it could be placed in operation.

Milk supplies were inspected and pasteurization of all milk and dairy products required. Regulations were enforced regarding the sale and distribution of dairy products. A milk ordinance was drawn up and submitted to the city officials. This was later passed and put into effect. It required the pasteurization of all milk.

A voluntary immunization clinic was established by the State Board of Health. More than 3,200 people in Chamberlain and surrounding territory were immunized. This does not include the number immunized by private physicians.

Money for food, clothing and fuel was obtained from the Reconstruction Finance Corporation. This made possible the cleaning up of the town and reconstructing the sewage system inasmuch as the men were furnished material things for their labor.

An emergency hospital was established in the City Hall and operated by the Red Cross, 38 patients being cared

for in this hospital and about 35 in the Chamberlain Sanitarium.

Due to the large number of cases developing so rapidly the local physicians were unable to care for their patients and outside physicians, mainly those from Mitchell, S. D., voluntarily came and assisted the local doctors.

The value of immunization was clearly demonstrated in this epidemic. There were 87 ex-service men living in the community who had not been immunized since 1918. Only one of them developed typhoid fever and his case was very mild.

The epidemic of typhoid fever at Chamberlain is the largest typhoid outbreak in the history of the State of South Dakota and probably one of the most concentrated epidemics that has occurred in the United States for some time. The City of Chamberlain has had bad water for a number of years, and the State Board of Health notified the city authorities of this fact and urged that they remedy the situation. The Board of Health in this state has no authority to force the city to improve its water supply. The people living along the Missouri River have the erroneous opinion that the river water is potable inasmuch as they think the water purifies itself in a very short distance.

The experiences of Chamberlain should be a lesson to all municipalities that they cannot economize in public health and expect to benefit by it. It is an expensive lesson and it is hoped that other communities will profit by it.

A complete and detailed report of this epidemic is now being prepared for publication.—Charles A. Hunter, Ph.D., Assistant Director of State Health Laboratory and Professor of Bacteriology and Hygiene, University of South Dakota.

Boston, Mass.—The 1932 annual report of the Boston Health League

directs attention to the increasing use of the census tract data throughout the city. Boston is divided into 128 census tracts. The unit of population is, therefore, extremely small in some areas making comparison of rates difficult. The Health League, Council of Social Agencies and the City Health Department have, therefore, agreed upon 14 permanent health and welfare districts based upon the census tract divisions. In the future, the Health League will prepare morbidity and mortality figures by health and welfare areas as well as census tracts.

The infant mortality study for 1930 was the first to be done by health and welfare areas according to census tracts. The study was published in the *New England Journal of Medicine* in August. In December a similar study of the 1931 infant mortality figures appeared in this *Journal*. Reprints are available from the League. Although a 2-year period is too short a time to draw final conclusions, the League has been much interested in the varying rates for different sections of the city, and an intensive study is being undertaken at present in Charlestown and the West End.

Orange County, Calif.—In 1932, the district health unit of Orange County became a complete county unit inasmuch as the last incorporated area was included in the health program. This unit reaches the 13 cities and the unincorporated area. Another forward step was made, coöperation was established between the health department and 3 school districts for a joint nursing service, "thereby avoiding the chance for duplication of effort and waste of time which might result from employing 2 nurses to carry on very similar programs in the same community."

In the face of a one-third reduction in budget, resulting in the loss of nurs-

ing and sanitary personnel, the department found more difficulty in the exercise of control of communicable diseases. The increase in cases reported was also accompanied by a tendency of families to refrain from calling physicians unless the illness became serious. There were 22,756 health department home visits in connection with the communicable disease work. During the year 2,000 children received protective treatments against diphtheria and 1,034 were vaccinated.

Cincinnati, Ohio—The city manager's report for 1932 states that every attempt was made to keep the physical city in prime condition. Crime and accidents were reduced, disease and infant mortality declined, while opportunities for healthful play and community cooperation increased during the year. A council of 9 members, according to charter, determines the policies of the city.

The physical examination of 49,661 elementary school children revealed 70,396 defects, of which 40,546 were classed as "remedial." Underprivileged children whose parents are financially unable to correct these defects, are cared for by district physicians, clinics, and hospitals. In one high school, a routine fluoroscopic and X-ray examination of the chests of all pupils was inaugurated.

The task of aiding the indigent sick increased markedly during the year. During 1931 the medical staff carried 10,407 home patients, made 17,499 home visits, besides serving 5,753 office patients who made 8,538 visits. In 1932, there were 16,952 home patients who received 23,385 home visits. In addition to 16,093 office patients with 21,299 office visits.

The Bureau of Sanitation and General Food Inspection was established, effecting a saving of \$5,100 a year by the consolidation of two activities.

Among noteworthy statistical records are the infant mortality rate of 54.7 in 1932, as compared with 71 in 1931, and the tuberculosis death rate of 87.2 in 1932, as compared with 111 the previous year.

San Diego, Calif.—The first public health department report under the provisions of the new city charter, for 1932, notes the appointment by the City Manager of the 5 members of the Public Health Commission and the Director. Special attention is directed to the surprise milk contests conducted by the state and to the scores obtained by the city of 96.5 per cent and 97.4 per cent in 1932. This local department highly endorses these contests which have been held for 11 years with 21 contests. The published results of the contests have built up a rivalry among milk distributors which has extended back to producers in improving the milk supplies.

A decline in communicable disease incidence, continued decrease in diphtheria deaths, with a forward program of immunization, are noteworthy results of the year. The County Medical Society, with plans proposed by the pediatric section of the State Medical Society, appointed a Pediatrics Committee to cooperate with the child hygiene division of the local health department in the conduct of preschool conferences.

Maplewood, N. J.—Maplewood, with a population of 22,000, was one of the winning communities in its population class in the 1931 Health Conservation Contest of the U. S. Chamber of Commerce. For the first time in 14 years, the community was free in 1932 from cases of diphtheria. This experience is accredited to the protection of children by immunization procedures. In 1929 there were 29 cases of diphtheria with 3 deaths, as contrasted with



6 cases and no deaths in 1930, and 3 cases and no deaths in 1931. The immunization campaign was inaugurated in 1929. A large proportion of preschool children and 81 per cent of school children have been given protection.

During the year 1932 there were 1,326 visits of children to infant welfare clinics. Special hours were arranged for immunization of preschool children against diphtheria and vaccination against smallpox. Baby foods were distributed in order to assist with formula and cod liver oil is provided for those unable to purchase these health foods.

As part of the routine health work, letters are sent parents with the birth certificate, stressing the importance of preserving this record for future reference. When the baby is 6 months old, another letter is sent, urging that protection be given the child against diphtheria and smallpox. Just before the child is of school age, another letter advises the parents to have dental and physical examinations made to correct possible defects.

It is gratifying to note that all of the dairy herds supplying milk have been tuberculin tested and that over 99 per cent of the supply is pasteurized, the remainder being of certified grade.

**Los Angeles County, Calif.**—A new health and welfare center was opened in February in Torrance, Calif., to serve over 60,000 persons residing in an area of 60 square miles. This health center is the eighth building of a chain extending through the county to bring preventive services with complete equipment and specially trained staffs to neighborhoods in a plan to decentralize

the activities of the County Health Department.

Constructed along the modern Californian style of architecture which is essentially Andalusian Spanish in theme, the Torrance Health and Welfare Center has an aspect of unpretentiousness and cheerful invitation which is calculated to dispel the mechanical impression usually received from a public institution. A California padre tile roof covers the entire building which is constructed of brick and finished with white stucco. Colored glazed tile in the recesses under the larger windows and waist-high in the reception room lends an atmosphere of shiny cleanliness with warm hospitality which is in sharp contrast with the dead white so frequently used in buildings devoted to the promotion and conservation of health.

The building was erected at a cost of \$42,615, out of the annual county health department budget. The value of the equipment is estimated at \$9,400. The site for the health center, comprising almost 3 acres of choice property, was given to the county by the City of Torrance.

**Peoria, Ill.**—The death rate in this city decreased from 12.3 in 1931 to 10.7 in 1932. All communicable diseases showed a marked decrease with the exception of diphtheria. There was a mild epidemic of chicken pox during the last 4 months of the year. A survey made in October showed that about 20 per cent of the preschool children and 48 per cent of the school group through the fourth grade had been protected against diphtheria. By January 1, these percentages had increased to 30 and 58 respectively. The physicians of this community are coöperating by providing immunizations in their own offices each Saturday morning for \$1 per treatment with the understanding that when the physician feels that the parents are unable to pay, the service will be performed without charge. A Schick test is made on the same basis.

# LABORATORY

## A TEST FOR REACTION-PRODUCING SUBSTANCES IN CONCENTRATED ANTIPNEUMOCOCCIC SERUM\*

### Preliminary Report

L. A. BARNES, PH.D., AND S. D. KRAMER, M.D.

*Antitoxin and Vaccine Laboratory of the Massachusetts Department of Public Health, and the Department of Preventive Medicine and Hygiene of the Harvard Medical School, Boston, Mass.*

THE occurrence of chills following the therapeutic use of certain lots of concentrated antipneumococcic serum is an objectionable feature for which there is, as yet, no satisfactory explanation. Frequently, an abrupt rise in temperature is noted subsequent to the chill. Although not all lots of serum give rise to these reactions, it appears that they may occur occasionally in spite of recent improvements in concentration and refinement.

In the preparation of concentrated serum, various methods have been employed in attempts to eliminate the chill-producing substances without serious decrease in the potency of the product.<sup>1, 2, 3, 4, 5</sup> The technic involves, as a rule, chemical or physical fractionation of the serum. Felton has reported some differences between reactive and non-reactive serums, particularly in the amount of protein precipitable at pH 4.6 to 4.8 and in the content of ammonia, and non-protein nitrogen.

Three lots of concentrated antipneumococcic serum, prepared at the Massachusetts Antitoxin and Vaccine Laboratory during the past year, serve as a basis for experiments to be reported in this communication. Lots

CP 28 and CP 29 were concentrated by the Felton alcohol method,<sup>6</sup> while CP 30 was prepared by his sodium sulphate method.<sup>7</sup> Lots CP 29 and CP 30 contained the same original serums, half of each bleeding going into each of the two lots. The serums were bivalent, containing both Type I and Type II antibodies. On the basis of physical appearance and potency all three lots were quite satisfactory. Following clinical use, however, it was found that CP 29 was practically chill-free, CP 28 produced moderate chills in only a low percentage of cases, while CP 30 gave more or less severe chills in a high percentage of cases. These data are shown in Table I.

Chills following the use of CP 29 were all mild and of relatively short duration; only one of those following injection of CP 28 was reported as severe. It was believed that these two lots were satisfactory for continued use. Felton considers a serum chill-free if these reactions occur in less than 20 per cent of cases.<sup>8</sup>

Comparative chemical tests performed with CP 29 and CP 30 showed no significant differences in content of ammonia, non-protein nitrogen, total nitrogen, amino nitrogen, total solids, or ash. The opinion has been held that an "acid fraction" of serum, precipitated

\*Read before the Laboratory Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1917.

TABLE I

CHILLS AND TEMPERATURE RISES IN HUMAN CASES OF LOBAR PNEUMONIA FOLLOWING THERAPEUTIC USE OF CONCENTRATED ANTIPNEUMOCOCCIC SERUMS

Serum Lot	Date Prepared	Period Used	Number of Cases	Number of Reactions		Percentage of Reactions	
				Chills	Temp. Rise	Chills	Temp. Rise
CP 29	11/2/31	2/ 8/32— 6/2/32	93	10	0	10.75	0
CP 28	6/19/31	10/25/31—3/22/32	36	6	1	16.66	2.77
CP 30	11/5—16/31	2/ 5/32—5/ 7/32	24	16	5	66.66	20.83

by adjusting the reaction to pH 4.6 to 4.8, contains most of the chill-producing substances.<sup>1</sup> No additional precipitate was obtained from either of these lots by such treatment. When diluted with progressively increasing amounts of physiological salt solution or normal horse serum, there was more precipitation with CP 29 (the "chill-free" lot) than with CP 30 (the "reactive" lot), thus making the possibility of protein precipitation in the blood stream remote.

Intravenous injections of the three

serums into rabbits produced chills and rises in temperature regardless of the lot used.

Following a suggestion by Drs. Bigelow and Heffron, experiments are being conducted with monkeys, (*Macacus rhesus*) to differentiate, if possible, reactive from non-reactive serums. Twelve monkeys have been used for testing CP 28, CP 29, and CP 30. The results are encouraging and are given in Table II.

It should be noted in Table II that CP 29, which produced only mild chills

TABLE II

CHILLS AND TEMPERATURE RISES IN NORMAL MONKEYS (*MACACUS RHEBUS*) FOLLOWING INTRAVENOUS INJECTIONS OF ANTIPNEUMOCOCCIC SERUMS

Serum Lot	Monkey Number	Weight in grams	Date Tested	c.c. Serum	Reactions	
					Chills	Temperature Rise (F)
CP 29	832	3012	4/4/32	5.0	No	0.1
	835	2589	4/6/32	5.0	No	0
	866	1770	7/1/32	10.0	No	2.4
	867	2058	7/1/32	5.0	No	3.6
CP 28	830	2258	4/4/32	5.0	Yes	3.1
	833	3298	4/6/32	5.0	Yes	0.8
	807	3483	4/8/32	2.0	No	0
CP 30	831	2754	4/4/32	5.0	Yes	2.0
	834	3808	4/6/32	5.0	Yes	1.8
	811	2400	4/8/32	1.0	Yes	2.2
	817	2640	4/8/32	0.5	Yes	2.0
	820	2765	4/8/32	2.0	No	1.5
	832*	3012	4/6/32	5.0	No	3.1

\* No. 832 had been injected 2 days previous with 5.0 c.c. of CP 29 and had no reaction, so was retested with CP 30 to serve as a control.

in 10.75 per cent of human cases, gave no chills in monkeys injected with 5.0 c.c. and 10.0 c.c. doses; CP 28, which was somewhat more reactive than CP 29 in human beings (16.66 per cent chills), produced chills in 2 monkeys given 5.0 c.c., but not in 1 receiving 2.0 c.c. CP 30, the chill-producing lot (66.66 per cent) in human patients, produced chills in 4 of the 6 monkeys tested, with doses ranging from 0.5 c.c. to 5.0 c.c. The 2 monkeys, 820 and 832, which failed to develop chills following the injection of 2.0 c.c. and 5.0 c.c. respectively, may have been unusually refractory animals, corresponding to unusually resistant human beings. While the number of animals used in testing this lot of serum is too small to draw definite conclusions, it is

of interest that the percentage of chills was the same as that in the human cases treated.

It may be of some significance that marked temperature rises occurred in monkeys 866 and 867 following the injection of CP 29 approximately 3 months after the first tests with this lot. The opinion has been held for some time that chill-free serums may develop reactive properties upon aging. This idea is shared by Sabin and Wallace.<sup>5</sup> These authors also believe that a temperature rise of 1.5° F. or more (in dogs) is the criterion for determining reactive substances.<sup>9</sup> It may be possible that the pyrogenic substances are precursors of the chill-producing materials. In tests on monkeys recorded above, the presence or absence of chills

TABLE III

CHILLS AND TEMPERATURE RISES IN NORMAL MONKEYS (*MACACUS RHESUS*) FOLLOWING INTRAVENOUS INJECTIONS OF ALCOHOL-SOLUBLE AND ALCOHOL-INSOLUBLE FRACTIONS OF CP 29 AND CP 30

Serum Fraction	Monkey Number	Weight in grams	Date Tested	Dose c.c.*	Reactions	
					Chills	Temperature Rise (F).
CP 29 Alcohol Soluble 2nd Preparation	869	1,635	7-1-32	10.0	No	5.1
CP 29 Alcohol Insoluble 2nd Preparation	861	2,045	6-24-32	10.0	Yes	2.3
	862	1,866	6-24-32	5.0	Yes (very slight) No	1.5
	868	2,379	7-1-32	7.2		2.9
CP 30 Alcohol Insoluble 1st Preparation	848	2,430	6-2-32	5.0	Yes	2.0
CP 30 Alcohol Soluble 1st Preparation	850	2,705	6-2-32	5.0	No	2.4
CP 30 Alcohol Insoluble 2nd Preparation	851	2,329	6-8-32	10.0	Yes	4.6
	853	2,571	6-8-32	2.0	Yes	2.5
CP 30 Alcohol Soluble 2nd Preparation	852	2,469	6-8-32	2.0	Yes	1.8
	854	3,040	6-8-32	10.0	No	0
	859	1,800	6-24-32	10.0	Yes	2.3
	860	2,008	6-24-32	2.0	Yes	1.6

\* The amounts given are in terms of doses of the original concentrated serums.

appears to be of more significance than rises in temperature. If, however, pyrogenic substances are related to chill-production, and the former appear earlier than the latter, a possible explanation is afforded for the temperature rises in monkeys 866 and 867 mentioned above. It would suggest further that CP 29 may later become a chill-producing serum. In this connection, it is of significance that the first 29 human cases during approximately the first 6 weeks of use of this lot, had no reactions. After this period, about 1 of every 6 patients had chills.

It has been suggested that reactions from antipneumococcic serum resemble, in some respects, those brought about by histamine-like substances. The following experiment contradicts this assumption. Alcohol-soluble and alcohol-insoluble fractions were obtained from CP 29 and CP 30. The alcohol-insoluble fractions showed approximately the same protective powers as the original serums, while the alcohol-soluble parts had little or no protection. These fractions were injected into monkeys in amounts calculated to correspond to doses of the original concentrated serum. The results of these tests conform to a large degree to those obtained following the injections of the original concentrated serums. It appears that both the alcohol-soluble and insoluble fractions of a chill-producing serum produce reactions in monkeys, while similar treatment of an essentially chill-free serum does not appreciably alter its reactivity. The details of the experiment are given in Table III.

#### SUMMARY

The production of chills and rises of temperature in 12 normal monkeys (*Macacus rhesus*) by intravenous in-

jections of three lots of concentrated antipneumococcic serum corresponded closely to the responses observed in human cases of lobar pneumonia treated with these serums. A serum essentially chill-free in human beings failed to produce untoward symptoms in monkeys; a serum mildly reactive in human patients, produced chills in certain doses in monkeys but not in a smaller amount; a third serum causing chills in two-thirds of the pneumonia patients treated, produced similar reactions in 4 of 6 of the monkeys injected. Intravenous injections into monkeys of alcohol-soluble and alcohol-insoluble fractions of a reactive and a non-reactive serum elicited responses similar to those following the administration of the original concentrated serums.

#### REFERENCES

1. Felton, Lloyd D. The protective substance in antipneumococcus serum. 5. Febrile reaction from intravenous injection. *J. Infect. Dis.*, 42, 3:256-262, 1928.
2. Felton, Lloyd D., and Kauffman, Gladys. The pyrogenic reaction to concentrated antipneumococcus serums, with respect to certain serum constituents. Second paper. *J. Infect. Dis.*, 49, 4:337-347, 1931.
3. Banzhaf, Edwin J., and Klein, A. J. A practical method for concentrating chill free pneumococcus antibodies from sera without use of salt precipitations. *Proc. Soc. Exper. Biol. & Med.*, 28, 3:276-278, 1930.
4. Banzhaf, Edwin J., and Klein, A. J. A practical method for concentrating chill free pneumococcus antibodies from plasma without use of salt precipitations. *Proc. Soc. Exper. Biol. & Med.*, 28, 3:278-279, 1930.
5. Sabin, Albert B., and Wallace, George B. On the nature of the chill-producing principle in antipneumococcus serum. *J. Exper. Med.*, 53, 3:339-362, 1931.
6. Felton, Lloyd D. The use of ethyl alcohol as a precipitant in the concentration of antipneumococcus serum. (Types I and II). *J. Immunol.*, 21, 5:357-373, 1931.
7. Felton, Lloyd D. Concentration of pneumococcus antibody. *J. Infect. Dis.*, 43, 6:543-553, 1928.
8. Personal Communication.
9. Sabin, Albert B., and Wallace, George B. A method for determining the chill-producing properties of antipneumococcic serum. *Proc. Soc. Exper. Biol. & Med.*, 27, 3:198-199, 1929.

NOTE: This is one of a series of studies being conducted under a grant from the Commonwealth Fund of New York.

## VITAL STATISTICS

Typhoid Fever Mortality in 1931-1932—Morbidity and mortality rates from typhoid fever differ more from one country to another than do the rates for most contagious diseases. The fact that in certain countries the cases and deaths are more accurately diagnosed and more faithfully reported than in others is not sufficient to explain these differences. Indeed, it is in those countries where the registration of cases of infectious diseases and the statistics of deaths are most complete that typhoid appears to be most rare, for it is certain that in many of these countries the services and the registration of medical statistics have progressed together.

If the death rate per 100,000 population from typhoid and paratyphoid fever is considered, the various countries may be grouped in several categories. The lowest typhoid death rates are observed in Germany, England and Wales, Scotland, Norway, New Zealand, the Netherlands, Sweden, and Switzerland, where rates of 1 per 100,000 or less prevail. These countries have reached their present level by a gradual reduction of typhoid mortality during recent decades. In England and Wales, for example, mortality from typhoid fever was no less than 37.4 per 100,000, during the years 1871-1875, and was still in excess of 6 in 1911. The situation was much the same in the Netherlands and in Germany. In the latter two countries, a recrudescence took place during the war, and persisted until 1921. With these exceptions, the countries belonging to the first group contrast with the others in the stability of their death rates, which as a general rule show only very insignificant fluc-

tuations from one year to another. It is interesting to note that the higher the typhoid mortality in a country, the greater will be the extent of the annual fluctuations in the rate. In other words, wherever the incidence of endemic typhoid is highest, the possibilities of epidemics are greatest.

Among the countries whose death rates fluctuated between 1 and 2.9 may be cited Australia, Austria, Denmark, the Irish Free State, Northern Ireland, and the Union of South Africa. Belgium, France, Canada, and the United States have death rates varying from 3 to 4.9.

The United States and Canada have shown a parallel evolution during the last two decades, the mortality in the U. S. Death Registration Area falling from 21 in 1911 to 9 in 1921, and to 4.5 in 1931. The Canadian curve, however, made a very noticeable jump in 1927, when the death rate rose to 11.6, owing to a milk-borne epidemic in Montreal. The geographical distribution of the typhoid fever mortality in the United States is distinguished by the maintenance of high death rates in the southern states as compared with the northern—*e.g.*, 2 of the North Central States, Minnesota and Wisconsin having rates of 0.6 and 0.7 respectively. In the south, on the other hand, Tennessee showed a rate of 10.7, West Virginia 12.6, Louisiana 14.5, South Carolina 16.6, and Georgia 16.7. These high rates in the southern states, however, do not mean that no progress is being made, for a considerable improvement has taken place during recent years, the rates in Tennessee and South Carolina having exceeded 20 previous to 1927.

The countries with a typhoid mortality ranging between 5 and 9.9 per 100,000, include Czechoslovakia, Poland, and Uruguay. In Czechoslovakia, after a severe outbreak in 1920, the death rate from this disease fell rapidly from 30.8 in that year to less than 10 in 1922, and finally to a new low level of 5.7 in 1932. Complete figures are available only for the Polish towns with a population of over 100,000 inhabitants, these towns having followed a course identical to that of Czechoslovakia: a maximum mortality in 1920, with 34.3 typhoid deaths per 100,000 population, and a mortality of less than 10 in 1930 and 1931. In 1932, however, a very marked rise occurred in Poland.

Among the countries whose present death rate is between 10 and 14.9 per 100,000 are Chile, Spain, the Straits Settlements, and Japan. Chile has been in this category only since 1929. Previous to that year, the typhoid mortality in this country was much higher, nearly always exceeding 40 per 100,000, and sometimes reaching a considerably higher level. The Spanish curve, after undergoing very wide fluctuations, showed an upward movement from 1911 to 1921, and fell sharply after that. The Japanese curve at first showed an almost constant rise until 1924, when typhoid fever exacted a toll of 24.8 deaths per 100,000, and since then the death rate from this disease has dropped considerably, reaching a rate of 10.9 in 1932.

Among the countries with a mortality of over 15, Greece, Hungary, Italy, and Portugal must be mentioned. For Italy, the curve has been sloping downward since the end of the war. It reached 30 deaths per 100,000 in 1918 and fell to a death rate of 15.6 in 1930. In Hungary, typhoid mortality, which was slightly in excess of 20 in 1913, reached its maximum in 1916 with a rate of 44.4 and decreased after that year to

a rate of 13.8 in 1925. An increase then occurred, reaching its culmination in 1929 (21.2). A fall in 1930 and 1931 was followed in 1932 by a considerable epidemic outbreak, the rate rising to 29.4. The epidemic was particularly severe in the northeast section of the country. Portugal experienced a rise in typhoid fever mortality during the war, reached a maximum in 1921 and has fluctuated since then around a rate of 20 per 100,000. In Greece, the mortality rate from typhoid fever has declined to its 1921 level of about 24 per 100,000, after having shown a marked rise to 32.5 in 1923.—League of Nations. *Epidemiological Report of the Health Section of the Secretariat. Month. Rep. No. 1-2*, pp. 3-6 (Jan.-Feb.), 1933.

**Preliminary 1933 Edition of Accident Facts**—Preliminary reports to the National Safety Council indicate that about 88,000 persons were killed in accidents during 1932, compared with a total of 97,415 in 1931. Of these 88,000 persons, 29,500 were killed in automobile accidents, 18,000 in other public accidents, 28,000 in home, and 15,000 in industrial accidents.

The estimated death rate from accidents for last year was 70.5 per 100,000 population, compared with 78.5 in 1931. The 1932 rate was the lowest in the history of the United States except for the years 1921 and 1922, when the rates were 68.4 and 69.6, respectively. The total number of deaths was smaller than in any year since 1924, when 85,684 deaths occurred. It is the second time that total accidental deaths have dropped since 1921.

Deaths in motor vehicle accidents declined during 1932, for the first time in history. The estimated total for the year was only 29,500 deaths, compared with 33,740 in 1931. There were 12,542 deaths in 1920; 21,877 in 1925.

This decline in motor fatalities of approximately 13 per cent means a saving of over 4,000 lives compared with 1931. The estimated death rate per 100,000 population from motor vehicle accidents in 1932 was 23.6, compared with 27.2 in 1931; this is the lowest recorded since 1928 when the rate was 23.3. The death rate per 100,000 cars registered was 121.5, compared with 130.7 in 1931; this is the lowest since the 1929 rate of 116.6. The rate per 10,000,000 gallons of gasoline consumption was 20.6, compared with 21.9 in 1931; the 1932 figure is a new low. In other words, the 1931-1932 percentage decline in motor vehicle deaths was about twice as great as the 6 per cent drop in motor vehicle registration or the 6.84 per cent decline in gasoline consumption (comparative 10 months' figures). Since these two factors are the best indicators of motor vehicle travel, it seems certain that the 1932 drop in deaths was due partially to a real advance in the safe use of streets and highways.

Forty-two states and the District of Columbia (total population 120,000,000) have reported comparable 1932 and 1931 figures. Of this entire group, Delaware and the District of Columbia were the only ones to show increases in 1932. The decrease was slight in some states but amounted to more than 20 per cent in others. North Dakota had the lowest death rate, 8.8 per 100,000 population, followed closely by Mississippi with a rate of 10.1. Nevada, on the other hand, had a rate of 56.7, California 39.9; and Delaware 35.0. While reports for the latest months of the year are missing from some states, complete 12 months' reports from over 100 cities also show a decline of 13 per cent. Cities with populations of over 500,000 had a drop in fatality of about 10 per cent, while smaller cities declined over 15 per cent. Milwaukee had the lowest death rate among cities

over 500,000, Rochester led the second group, and Peoria the third. Medford, Mass., with a population of 64,300, is the largest reporting city to have gone through the entire year without a motor vehicle death.

About 28,000 persons were killed in home accidents during 1932, a reduction of about 3 per cent from the 1931 total of 29,000. The 1932 estimate is based on representative city reports, which show a smaller decline in home fatalities than in any other of the principal classes. Falls and burns were responsible for about 60 per cent of all home deaths, while asphyxiation, suffocation, and poisons accounted for another 15 per cent. About 30 per cent of the victims were children under 15 years, many of these deaths resulting from burns, suffocation, and poisons. The mortality was high, also, among elderly persons, where falls were responsible for most of the deaths. On the basis of the ratio (experienced by insurance companies) of 150 non-fatal home injuries for each fatality, there were, roughly speaking, 4 million non-fatal home injuries in 1932.

There were about 15,000 industrial deaths in 1932, a reduction of 14 per cent from the 1931 total of 17,500. The estimate is based chiefly on the reduction in deaths reported to Industrial Commissions in 16 states, but as agricultural accidents are seldom reported to the Commissions it was necessary to estimate them separately. The state records show a decrease of 18 per cent, while the few available data on farm deaths indicate that there has been no decrease in the past several years.

Much of the decrease in accidents during the past 2 years was due to the great decreases in employment. However, records of member companies of the National Safety Council show that accidents have dropped even more than exposure. The number of lost time in-



juries per million man-hours worked dropped more than 50 per cent from 1926 to 1931, and the days lost per 1,000 hours worked declined over 30 per cent during the same period. The gains from 1929 to 1931 are exceptionally large.

Deaths in public accidents where a motor vehicle was not involved numbered approximately 18,000 in 1932. This is a 10 per cent drop from the 1931 estimate of 20,000, the decline being indicated by detailed reports from large cities throughout the country. The decrease shown for accidental deaths of this type was not quite as large as that shown for motor vehicle and industrial accidents. Drownings made up about 30 per cent of all fatalities in this group, railroad accidents (not motor vehicle) 16 per cent, and firearms accidents 11 per cent. The death rate from drowning dropped 37 per cent from 1910 to 1920, but since then little progress has been made. Firearms deaths have shown little change in the past two decades.

During the school year 1931-1932, accidents to school children numbered 9.4 per 100,000 student-days, and each accident resulted in 3.6 days lost from school. In the preceding 2 years the frequency was 10.3 and the average loss 3.0 days. Thus, during the last year there were fewer accidents, but on the average they were somewhat more serious. — National Safety Council. *Public Safety*, 7:4-11. (Feb.), 1933.

**Deaths from Beriberi in Japan—**Statistics show that beriberi is one of the important causes of death in Japan, especially among infants. During the 10-year period 1920-1929 there were in Japan, on the average, 17,000 deaths from beriberi annually, showing an average annual death rate of 29.4 per 100,000 population. Of the annual deaths from this cause, 62 per cent were among males and 38 per cent among

females. At ages 0-4, there was very little difference in the sex distribution, but during the years of adolescence, the disease was noticeably more prevalent among males. The sex discrepancy was at its maximum at ages 45-70, when 84 per cent of the deaths were among males.

Mortality from beriberi was highest in the first year of life when the death rate was 416 per 100,000; among infants the greatest number of deaths occurred in the second month of life, and thereafter fell progressively. At ages 2-9, the mortality was negligible; at ages 20-24 it rose to about 25 per 100,000; and at ages 40-80 it was about 11-13 per 100,000. The deaths showed marked seasonal distribution, rising in May and reaching their peak in autumn. In fatal cases three-fourths of the deaths followed an illness of less than 1 month. The death rate from this cause in the large towns was twice as high as in the small towns and rural areas.—H. Maki, *Observation statistique des deces causes par le beriberi au Japon propre. Kitasato Arch. Exper. Med.*, 1932, v. 9, 202-17. Abstr. by A. Bradford Hill in *Bull. Hyg.*, 8:140 (Feb.), 1933.

**The Homicide Record for 1932—**The homicide record in the United States for 1932 shows no material variations from the record for the year before. As measured by the results for 31 American cities with an aggregate population of 25,000,000 in 1932, the homicide rate remained at exactly the same figure as for the previous year—10.8 per 100,000, which compares with a rate of 9.4 for 1922 and 8.3 for 1912.

Homicide returns tabulated by the U. S. Bureau of the Census for 36 cities, which in 1929 had a collective population of 27,000,000, show that in 1900 these cities had a homicide rate of only 3.4 per 100,000, the rate increas-

ing to 8.4 in 1920 and by 1929 to 9.8. This rate is almost triple that of 30 years ago. The whole U. S. Death Registration Area showed homicide rates of 8.7 per 100,000 in 1927; 8.8 in 1928; 8.5 in 1929; 9.0 in 1930; and 9.3 in 1931.

Although the returns for 1932 for the whole country are not yet available, preliminary returns furnished by local boards of health for 180 American cities (which in 1932 had an estimated population of 42,481,911) showed that the rate for this group of cities in 1932 was 10.5 per 100,000 against 10.7 for the previous year, a small decrease not suggestive of much progress in crime prevention or control.

Analyzing the returns for the 180 cities, it appears that in 70, the rate increased, and in 92 the rate declined, while in 18 it remained the same. The returns showed 8 cities with rates in excess of 40 per 100,000. All of these are southern cities and the victims in most cases were negroes. As has been the case for some years past, Memphis heads the list with a homicide rate of 54.2, which is over 5 times the average rate for all the cities represented in the entire tabulation. The Memphis rate unquestionably is unduly increased by the exceptional frequency of admissions of outside murder patients to local hospitals, a condition which cannot be avoided, without the allocation of deaths according to the scene of crime. Equally amazing is the high rate for Lexington, Ky., which ranks next to Memphis, with a rate of 53.6 for 1932, as against 36.8 for 1931. Jacksonville, Fla., had a rate of 52.2; Little Rock, Ark., 44.8; Montgomery, Ala., 43.6; Charleston, S. C., 43.5; Savannah, Ga., 42.2; and Birmingham, Ala., 40.8.

In gratifying contrast to these southern cities with high homicide rates is the record of 21 cities without a single homicide in 1932; and of these, 7 had none in 1931. The rate for Boston,

Mass., has declined from 3.6 in 1931 to 2.5 in 1932, a remarkably low rate for a city with nearly 800,000 inhabitants. Worcester, Mass., has likewise a very low rate for 1932—only 2 per 100,000. The low rates for Portland, Me., and Providence, R. I., are of special interest because the death penalty has not prevailed in Maine nor Rhode Island for many years. Providence in 1932 had a homicide rate of only 1.2, while the rate for Portland was only 2.8. The death penalty has been abolished in Wisconsin, where in the city of Milwaukee, the homicide rate in 1932 was only 3. Capital punishment is not enforced in Minnesota; the homicide rate for Minneapolis was only 4.4, while that of St. Paul was 3.6.

Comparison of the 1932 and 1931 homicide rates for the 5 largest cities of the country shows rates of 12.8 and 14.1 per 100,000 for Chicago; rates of 9.6 and 10.8 for Detroit; 8.4 and 7.0 for Los Angeles; 8.0 and 8.3 for New York; and 7.8 and 7.2 for Philadelphia, for the 2 years 1932 and 1931, respectively. The actual number of homicides in the 5 largest centers of population combined decreased from 1,485 to 1,464; in other words, the crime situation, collectively considered, remained practically stationary. Chicago, alone of these 5, had a rate above the average for the country at large.

The high homicide rates for southern cities suggest a brief reference to the racial aspects of the problem. In 1929 (there being no later returns), the homicide rate of the U. S. Death Registration Area was 5.2 for the white population, and 38.1 for the colored, an extraordinary difference, explicable chiefly on racial grounds and the negro's inclination to deeds of extreme violence on slight provocation, but the high negro rates usually correspond to comparatively high rates also for the white population, as shown in the following comparison for selected cities.

In 1929, Atlanta showed a homicide rate of 14.1 for the white population as compared with 109.8 for the colored; Birmingham—rates of 17.8 and 89.7; Dallas—7.9 and 52.7; Louisville—7.3 and 84.7; Memphis—11.8 and 144.2; and New Orleans—11.1 and 64.0.

The southern states present practically the same situation in regard to homicides as reflected in statistics of southern cities. In 1929, Alabama recorded rates of 8.7 per 100,000 for its white population, and 39.0 for colored; Arkansas—7.7 and 37.6; Florida—11.7 and 59.0; Georgia—8.4 and 34.9; Kentucky—11.4 and 72.3; Louisiana—7.0 and 32.7; Mississippi—10.2 and 36.0; and Tennessee—7.3 and 58.6.

By way of comparison, study of 13 Canadian cities with an aggregate

population of 1,875,194 in 1932, shows a homicide rate in this year of 1.3 per 100,000, the rate having declined from 1.6 in 1931. Eight of the cities in this group had no homicides at all in 1932. Toronto with a population corresponding to that of leading cities in the United States, had the highest homicide rate—one of 2.2 per 100,000, Winnipeg ranking next with a rate of 1.8.

The deplorable situation in the United States in regard to homicides appears even worse when compared with the rate in England and Wales, where during the years 1921 to 1931, homicides did not exceed 0.7 death per 100,000 population; and in 1931, there were 0.5 homicides per 100,000.—Frederick Hoffman. *The Homicide Record in 1932. Spectator* (Mar. 30), 1933.

## PUBLIC HEALTH ENGINEERING

**New Type of Sewage Distributor**—The new Dorrico distributor, for applying settled sewage evenly over circular trickling filters, is described and illustrated. The distinctive feature of the distributor contributing more to its efficacy than any other single item, is the adjustable, flat spray type of nozzle used. The sprays wet overlapping areas, assuring complete utilization of bed surface at each revolution and also absence of dry spots, effectively preventing breeding of flies.

The nozzles are readily adjusted, both as to volume of sewage passed and the shape and thickness of the spray. The distributor may be fed either from an automatic dosing siphon or directly by a pump. In either case satisfactory operation may be secured with a head of 12 inches of water, the reaction of the sprays providing the tangential force required to rotate the

arms.—A. Anable. *Contract Rec. & Eng. Rev.*, 46, 41:1164-5 (Oct. 12), 1932. From *Pub. Health Eng. Abstr.*, 2-4-33. Abstr. Rudolph E. Thompson.

**Sterilization of Dairy Containers and Utensils With Dry Heat Approved**—The Commissioner of Health has accepted dry heat sterilization as an approved method of sterilizing milk containers and utensils. If this procedure is used, containers and utensils should be placed in the sterilizing box or cabinet in a moist condition. The temperature in the sterilizer should then be raised to 200° F. and maintained at that point for 10 minutes. The containers and utensils may then be removed, and another set placed in the cabinet. After exposure to 200° F. for 10 minutes, the heat should be shut off and this second set allowed to cool while in the sterilizer.

The time necessary either (1) to heat the utensils to the specified temperature, or (2) to cool them from that point in the sterilizer, is considered essential as well as 10 minutes' exposure as outlined above.

A careful study of dry heat sterilization was made by the New York State Agricultural Experiment Station at Geneva, N. Y. The results are reported in *Bulletin No. 612* issued by that Station. It is recommended that health officers procure a copy of this publication in order that they may become familiar with the details of this procedure. Such knowledge is necessary to insure proper supervision of dry heat sterilization of dairy containers and utensils.—Anon. *Health News*, New York State Dept. of Health, 9, 38:153 (Sept. 19), 1932.

**A Waterborne Epidemic of Typhoid Fever**—A severe outbreak of typhoid at the village of Ecclefechan, Dumfriesshire, in the summer of 1930 after heavy rains was traced to the water supply. Spring water is piped to two tanks and storm water carried past the lower of these by a field drain. Surface openings in the drain and faulty joints in the pipe where this crossed the drain enabled contamination, deposited at any part of the valley, to enter the spring water. Identification of a typhoid carrier in the water-collecting area confirmed this supposition. Measures taken included refilling of the tank with chlorinated water, chlorination of the supply and overhauling of the pipe line.—J. Ritchie and E. Armstrong. *J. Hyg.*, 32:417, 1932. From *Summary of Current Lit.*, Water Pollution Research, VI, 4:111 (Apr.), 1933.

**A Tour of Hamburg**—A description is given of the problems of water supply and sewage disposal in Hamburg, where a population of  $1\frac{1}{4}$

millions has a state territory of only 415 sq. kn. of which a quarter is under water. Reference is made to the many publications on Hamburg's water supply. This is drawn mainly from artificial ground water works at Curslack which are shortly to be supplemented by new works at Grossensee and Grosshansdorf. At present a quarter of the supply is drawn from the Elbe, treated in settling tanks with coagulation and prechlorination, filtered through open sand filters and chlorinated. Although of excellent bacteriological and chemical quality, this water has many disadvantages such as a high salt content, variable temperature, tastes from organic wastes, etc. It is hoped in time to replace Elbe water by ground water.

Two sewage treatment plants at Langenhorn and Elmshorn are described. Both of these have "Dywidag" tanks and activated sludge plants. The sewage of Elmshorn contains in a total flow of about 6,000 c.m. about 2,000 c.m. per day of tannery wastes and 2,500 c.m. of other trade wastes. As a result of successful treatment of sewage and tannery wastes in the present plan, a large scale plant, comprising sand trap, screens, "Dywidag" tanks and activated sludge tanks, is under construction. The whole sewage of Hamburg itself, after passing through a coarse screen and a sand trap, is discharged into the Elbe 8.5 km. below the intake of the water works.—K. v. Vagedes, *Kl. Mitt. Ver. fur Wasser-Boden- u. Lufthyg.*, 8:217, 1932. From *Summary of Current Lit.*, Water Pollution Research, VI, 4:113 (Apr.), 1933.

**Progress in the Construction of Small Iron Removal Plants**—Two forms of iron removal plants suitable for small supplies are described. In the first the water is pumped by a hand pump to the top of a tower in which

is placed a suitable depth of filter material with a water storage space and outlet tap at the bottom of the tower. The second form of plant is suitable for attachment to a water pipe. The water flows on to a coke layer and passes, in finely distributed form, to a bed of sand, gravel and charcoal. Iron sludge can be removed from this bed by back-washing. Both plants can be adapted for the removal of small quantities of manganese or can be used as mechanical filters for turbid water.—W. E. v. Gronow, *Gesund. Ing.*, 55: 495, 1932. From *Summary of Current Lit.*, Water Pollution Research, VI, 4:116 (Apr.), 1933.

**Killing Pond Weeds in Storage Reservoirs**—Pond weeds in a small open storage reservoir less than 1 acre in area at Scranton, Pa., were killed by application of about 1,500 lb. of copper sulphate to the bottom after draining and removal of the mud by scraping. Their reappearance the following year led to a further treatment with 2,000 lb. of copper sulphate which has, it is believed, killed off most of the weeds. The whole work cost \$300. A heavy dose of copper sulphate was necessary to penetrate the mud and kill the roots.—G. R. Taylor, *Am. City*, 47, 4:7, 1932. From *Summary of Current Lit.*, Water Poll. Research, VI, 4:119 (Apr.), 1933.

**Ipswich Sewage Disposal**—After a brief description of the previous sewerage and sewage disposal systems of Ipswich, an account is given of the new high level sewerage system and disposal works. The population of Ipswich is about 87,000 and the daily dry weather sewage flow about 1 mil. gal.

Mechanically raked screens are inserted in both the new high level and the old low level intercepting sewers. Screenings fall into troughs and are washed by sludge from the sludge

tanks to a stereophagus pump which breaks up the screenings and lifts them to the sludge tank. By using sludge for carriage of screenings the extra bulk added to the sludge tanks is limited to the screenings only. Low-level sewage is then pumped to mix with high-level sewage and the whole is passed through mechanically cleaned detritus tanks at a velocity of about 1 ft. per sec. and with a retention period of about 1 min.

Hopper type horizontal flow settling tanks provide 12 hours' retention for 6 times dry weather flow (the estimated dry weather flow 40 years hence). The effluent is discharged into the river and sludge is carried out to sea.—*Surveyor*, 82:547, 1932. From *Summary of Current Lit.*, Water Pollution Research, VI, 5:128 (Apr.), 1933.

**Gas Production and Utilization in the Municipal Sewage Works of Blankenburg (Harz)**—The Blankenburg sewage works, for a population of 12,000, comprise settling tanks, digestion tank, trickling filters and humus tanks. The construction of the digestion tank, a cylindrical tank divided into two communicating sections, with a submerged cover and two gas collecting domes, is described. The sludge is heated by hot water coils and, although the sludge is not stirred to give even heating, the effect on gas production has been satisfactory—80–100 c.m. of gas are obtained daily.

The gas is used for heating the water for the digestion tank, for a gas engine and dynamo which generate sufficient electricity to supply the power and light requirements of the works, and for heating offices and houses in the works. As these uses do not exhaust the gas, it is proposed to introduce a plant for circulating the sludge in the digestion tank.—*Weidlich. Gesund. Ing.*, 55:485, 1932. From *Summary of Current Lit.*, Water Pollution Research, VI, 4:129 (Apr.), 1933.

## INDUSTRIAL HYGIENE

**Air Cooling by Conduction and Convection**—This article describes the method of calibration of the coolometer as an anaemometer. An expression for the determination of velocities of air over 100' per minute is developed from the experiment; no exact expression for velocities below 100' per minute could be obtained.

The authors suggest that the effect of radiation may be measured by using this instrument first as a polished body and then coating it with lamp black for use as a black body.—Walter S. Weeks and Fred G. DeBerry, *J. Indust. Hyg.*, XV, 1:34-39. L. G.

**Air Conditioning with Relation to Comfort, Health and Efficiency**—The first part of this article deals with air conditioning experiences in a home in Columbus, Ohio, which was studied over a period of 10 years by the author. Conditions, particularly those during the winter seasons, are described. A careful record of disabilities of an experimental group consisting of the family of 5 persons showed a better than average health record. The author believes that this tends to support the belief that the state of nutrition (resistance) and not "bad air" determines respiratory affections and their complications.

The second part of this article considers the various aspects of schoolroom ventilation. The chief complaint in uncomfortable rooms is not ventilation but overheating, to which stuffiness and odors bear a direct relation. The author feels that education in air-conditioning principles and purposes, and in optimum air temperatures, is essential.—Emery R. Hayhurst, *J. Indust. Hyg.*, XV, 2:98-115. L. G.

**The Influence of Respiration and Transpiration on Ionic Content of Air of Occupied Rooms**—A series of experiments is described dealing with the number of small ions affected by respiration and transpiration, and the effect on the ionic content of occupied and unoccupied rooms, of (a) no ventilation, (b) window ventilation, and (c) mechanical ventilation.

In rooms there was a marked decrease in the number of both positive and negative ions with occupancy. These ions increased in number as the occupants of the room departed. The loss of ions in occupied rooms appears to be largely due to adsorption by clothing, and to a small extent to respiration and transpiration through the skin. Expired air was found to be devoid of ions.

The minimum supply of outdoor air required to maintain normal ionic content in a crowded room was found to be prohibitively high—160 cu. ft. per person per minute. A supply of 30 cu. ft. per person per minute did not appreciably increase the ionic content of the air.

No evidence is presented to prove or disprove the prevailing belief that ionization might be a factor in ventilation.—C. P. Yaglou, L. Claribel Benjamin and E. Allen Brandt, *J. Indust. Hyg.*, XV, 1:8-17, 1933. L. G.

**Further Research on the Production of Carbon Monoxide from Paint in Sealed Compartments**—Previous investigations have shown that the paint used on the walls of sealed ship compartments gives off carbon monoxide. The present study was inaugurated to determine the quantitative aspects of the problem using vari-

ous types of paint. The materials investigated were iron oxide paint, red lead paint, aluminum paint, bituminous compositions, and grease paints. The experiments indicated that any composition containing linseed oil, in a confined space, not only gives rise to dangerous concentrations of carbon monoxide but will also, through absorption of oxygen during drying, produce an atmosphere markedly, and in some cases almost completely, deficient in oxygen.

Biological experiments with mice were also carried out to determine the effect of the gaseous content of the sealed painted compartments.—R. C. Frederick, S. F. Dudley, F. G. Edwards, *J. Indust. Hyg.*, XV, 1:1-7, 1933.

L. G.

**Report of Advisory Committee on Employment of Minors in Hazardous Occupations**—This is the report of the special committee appointed to follow up the White House Conference on Child Health and Protection in coöperation with the Children's Bureau. The committee met in Washington May 24-26, 1932, and its conclusions, after various drafts, are reported herewith. It is recognized that these recommendations may require revision from time to time, in which case the help of the committee will again be sought.

The Report considers first specific recommendations for minors under 18, *i.e.*, their prohibition in occupations involving (1) general mechanical hazards, of which 28 are listed, (2) mechanical hazards with specified machines, of which 34 are listed, and (3) occupations involving various health hazards. This latter group lists exposures to heavy chemicals, unsterilized hides or animal hairs, various physical conditions (named), certain dusts in injurious quantities, 16 specified poisons, and excessive exposure to 11 other poisons with a provision in

each poison list for "other substances having similar injurious properties."

Children under 16 should not be permitted to work in any employment, except when schools are not in session and then in a carefully restricted list of occupations (not specified).

Among the general recommendations are power to be given to state labor boards to determine what are dangerous and injurious occupations, to revise from time to time the rules that have been laid down, the enforcement of laws and rulings, the matter of extra compensation, machinery or other apparatus in educational and other institutions, conditions of work (which are injurious), etc.—*Month. Labor Rev.*, 35, 6:1315-1322 (Dec.), 1932. E. R. H.

**Third Report of the Miners' Nystagmus Committee**—Two previous reports upon this subject appeared in 1922 and 1923, as Nos. 65 and 80 in this series. The principal finding of the earlier committee was that the nystagmus was caused by an insufficiency of light reaching the eye of the miner while at work, and the present committee reaffirms this finding in the strongest terms.

The criterion of incapacity is not easily determined. Mere oscillation of the eyeballs is not a trustworthy test of incapacity, since many men with this symptom are working efficiently. On the other hand, the absence of this symptom, in the presence of symptoms of a nervous or psychological kind, is not sufficient proof of fitness for work. It is the opinion of the committee that the true significance of the various symptoms can be elucidated only by medical men with the requisite training.

An appendix, by Professor Culpin, gives the findings of an experimental investigation of 36 cases of miners' nystagmus, and another appendix, by T. L. Llewellyn, the relation of changes in illumination to the incidence of

nystagmus.—Medical Research Council, *Special Report Series No. 176*, 1932, 36 pp. British Library of Information, 270 Madison Ave., New York, price 9d. net. E. R. H.

**The Incidence of Color Blindness among Races**—Color blindness for white males showed an incidence of 8 per cent and for females 1 per cent. The incidence among all other races (Indians, Mexicans, Spanish-Americans and Negroes) was very much less, although higher among males than females. The incidence among white male Jews was 4 per cent, while for white female Jews it was zero. Geographical classification apparently has no influence in the matter of color blindness.—Thomas R. Garth, *Science*, 1996:333-334 (Mar. 31), 1933.

E. R. H.

**Speed of Visual Perception**—Author's summary and conclusions:

1. A time factor should be incorporated in our visual acuity examinations.
2. 0.5 second observation time is a good standard unit for each eye.
3. Visual speed by daylight is decidedly faster than by artificial illumination.
4. Visual speed ranged from 0.5 second per letter to 0.01 second among candidates examined.
5. A few candidates with a slow color perception apparently compensated with rapid form perception.
6. Color perception is not diminished as rapidly as form perception by shortening the period of observation.
7. Form speed of perception for both eyes is twice that of monocular vision.—

P. Richmond, E. C. Ebert, *U. S. Nav. Med. Bull.* 31, 2:150-151 (Apr.), 1933.

E. R. H.

**Influence of Industry on Public Health**—After reciting the influence of lead, industrial cancer, anthrax, dust, nystagmus, dermatitis, and accidents in relation to public health, the author stresses the value of the industrial periodic examination of workers to the

public in general. The increasing incidence of tuberculosis among females is ascribed to fatigue and its consequences, not produced by employment but by the efforts spent in relaxation. "Speaking generally, it is not my view that industry as carried out in factories or workshops adversely affects health; rather do I think that in many respects it exercises a beneficial effect not only on those actively engaged in it but also indirectly on those not so employed."—J. C. Bridge, *Lancet*, 5718:697-698 (Apr. 1.), 1933.

E. R. H.

**Control of the Silicosis Hazard in the Hard Rock Industries. IV. Application of the Kelley Trap to Underground Drilling Operations**—This report extends the investigation of the Kelley dust trap to include its application to underground operations as well as in open excavation work. The results of the test indicate that for horizontal and down drilling, an air flow of 200 cu. ft. per minute through the hood is necessary to keep the dust concentration at the breathing zone to below 10 million particles per cu. ft. of air.

Dust counts obtained during wet drilling were higher than those given by the blower type drill equipped with an exhaust hood. The speed of drilling was found to be 40 per cent higher and the overall footage 8 to 26 per cent higher in the case of the blower type drill as compared to the American and South African type wet drills.

The need for efficient and compact dust disposal plants for underground work is pointed out.—Theodore Hatch, J. W. Fehnel, Henry Warren, and George S. Kelley, *J. Indust. Hyg.*, XV, 1:41-56, 1933.

L. G.

**A Study of 78 Workers Exposed to Inhalation of Cryolite Dust**—In this study 78 workers engaged in the crushing and grading of cryolite



(aluminum-sodium fluoride) were examined and X-rayed. The mineral contained approximately 3 per cent of quartz. All of the workers studied were exposed for a period of 2 years and over; 22 had been engaged for more than 10 years. Of the 78 workers studied 22 were negative and 17 were classified as probably negative; 25 were classified as having probable second stage silicosis or second stage silicosis of mild or marked degree. Two-thirds of the workers engaged over 10 years had second stage silicosis. There did not seem to be an excess of pulmonary tuberculosis among the workers but 4 cases of pulmonary tuberculosis were discovered and three of these occurred among persons having no silicosis. No dust counts are presented in this report.—Sk. V. Gudjonsson, *J. Indust. Hyg.*, XV, 1:27-33, 1933. L. G.

**Studies in Dust Retention.**  
**IV. Dust Retained by the Tracheotomized Cats**—This article describes experiments in dust retention by tracheotomized cats by exposing them to limestone dust (particle size averaging less than 1 micron) and magnesium oxide dust (average particle size less than 0.5 micron) of varying concentrations in a large gas-tight cabinet. The rate and depth of breathing of the cats were varied and the effects noted.

Five to fifteen experiments were performed on each animal, the period of dust exposure varying between 4 to 30 minutes depending upon dust concentrations and breathing rates. The average exposure was about 10 minutes.

The results showed that the retention of limestone dust increased rapidly with concentration while that of magnesium

oxide increased but slightly with concentration.

Macroscopic examination of the lungs at autopsy indicated that prolonged dusting with magnesium oxide caused dusky areas of hyperemia in the independent portions of the lungs.—Tomoyoshi Ishikawa and Philip Drinker, *J. Indust. Hyg.*, XV, 2:57-65, 1933. L. G.

**Effect of Certain Silicate Dusts on Lungs**—This paper presents the results of a study on the pulmonary effects of the inhalation of tremolite talc, red slate and a greenish slate. All of these substances contained approximately 60 per cent silicate; the tremolite talc contained no quartz, green slate but a trace and the red slate 3 per cent of quartz. The workers were engaged in the crushing and grading of the material.

The dust count in the tremolite talc industry was approximately 1,400 million particles per cu. ft. of air for miners and 52 millions for millers. Among the slate workers the millers were exposed to about 700 million particles per cu. ft. of air and other workmen to about 15 million such particles.

It was found as the result of this study that the workers exposed as noted above became afflicted with a fine, diffuse bilateral pulmonary fibrosis which apparently did not yield disability.

Two cases of third stage pneumoconiosis were found in the slate workers but none were found in the tremolite talc group in spite of the fact that over 20 men were engaged for more than 15 years.—Waldemar C. Dreessen, *J. Indust. Hyg.*, XV, 2:66-78, 1933. L. G.

## FOOD AND NUTRITION

**The Winesap Apple as a Source of Vitamin C**—Since Winesap is the leading variety of apple commercially grown in the United States, this variety was used for the experiment. Fruit from trees not fertilized and from trees receiving applications of complete fertilizers were selected. The feeding experiments were conducted between November 3 and February 15.

Thirty-seven guinea pigs weighing approximately 294 gm. were used. A basal vitamin-C-free ration consisted of oats, baked skim-milk powder, butterfat, sodium chloride, and cod liver oil. Six animals were used as positive controls and received orange juice while 6 animals as negative controls were given the basal ration only. Eleven animals were fed 5 gm. of apple, 13 were fed 10 gm., and 2 were fed 15 gm. daily, 6 days per week. Records were kept as to the animals receiving apples from fertilized and unfertilized trees. The experimental periods were 90 and 70 days' duration and the animals were weighed on alternate days and observed for symptoms of lameness, soreness, and enlargements of wrists.

The positive groups made weight gains, survived the experimental period, and autopsy exhibited no symptoms of scurvy, while the negative control group showed severe scurvy symptoms, weight losses and an average survival period of 26 days.

The 5 gm. level of apple feedings did not furnish adequate protection from vitamin C deficiency. This was particularly true when the apples fed were from trees not receiving complete fertilizer. The 10 and 15 gm. levels of apple feeding fully protected the animals from scurvy whether the fruits

were from trees fertilized or non-fertilized. The animals survived the experimental periods and made small weight gains.—Myra T. Potter, *J. Home Econ.*, 25:52 (Jan.), 1933.

**The Vitamin C Content of the Winesap Apple as Influenced by Fertilizers**—This is the report of a more detailed study made to find the relative influence of the application of fertilizers upon the Winesap apple as a source of vitamin C. The fruit was obtained from trees 20 years old. The fertilized trees during 1928 to 1931, inclusive, received annual applications per tree of complete fertilizer—5.7 lb. of an equal mixture of ammonium sulphate and sodium nitrate, 11.7 lb. of superphosphate, and 3.9 lb. of a mixture of equal parts of muriate of potash and sulphate of potash. The check trees received no fertilizer applications. A basal vitamin-C-free ration was fed. Forty-two guinea pigs, weighing 325 gm. each were grouped as follows:

Six animals received the basal ration plus orange juice; 6 animals received the basal ration only; 15 animals received the basal ration plus 5 gm. of fertilized Winesaps; and 15 received the basal ration and 5 gm. of non-fertilized Winesap apples. The apple feedings were made daily, 6 days a week. The animals were observed daily for lameness, soreness, and enlargement of wrists, and were weighed on alternate days. In 1930-1931, the experimental period was 70-90 days and in 1931-1932 it was 56 days.

It was found that 60 per cent of the animals receiving apples from fertilized trees were protected or developed only mild scurvy, while not one of the

animals fed apples from non-fertilized trees was protected, and 80 per cent developed moderate to very severe scurvy.—Myra T. Potter and E. L. Overholser, *J. Agri. Res.*, 46:367 (Feb. 15), 1933.

**Vitamin A in Six Varieties of Frozen Cherries**—In this investigation, frozen cherries of sour, sweet, and hybrid types were used. Sound fruit was washed, dried, packed in small glass jars, and placed in a refrigerating room at a temperature of  $-10^{\circ}$  C. The fruit was held from 6 to 10 months and individual feedings were weighed and fed while still frozen. Rats between 21 and 28 days of age and weighing 44 gm. were placed on a vitamin-A-free diet, consisting of corn-starch, casein, Osborne and Mendel salt mixture, powdered dry yeast and sodium chloride. Four different levels—0.125, 0.250, 0.375 and 0.500 gm.—of cherry portions were fed daily. In this study it was found that the Lambert, the Bing, and the Deacon, the black sweet varieties, were relatively lower in vitamin A than the Royal Ann, the Late Duke, and the Montmorency. The Montmorency was the richest source of vitamin A. Of the sweet varieties, the Royal Ann ranked highest as a source of vitamin A. The cherry compares favorably with other fruits in vitamin A potency.—Myra T. Potter and Mabel A. Dickson, *J. Home Econ.*, 25:47 (Jan.); 1933.

**Study of the Iodine Content of the New Zealand Seaweed and Fishes**—The authors have recorded the iodine content in a number of seaweeds and fishes. Seaweeds on the Pacific Coast of Otago are comparable to similar species on the Pacific Coast of British Columbia. In one specie, *Cystophora retroflexa*, over 0.1 per cent of iodine is contained, and 70 to 80 per cent of this appears to be in the

inorganic or loosely bound form. Analytical methods are given for the determination of iodine and for the detection of di-iodotyrosine which has been identified.

Experiments on rabbits were performed to note the change in iodine content of the blood during anesthesia. These experiments suggest that only in the case of inorganic iodine will there be a redistribution of iodine between tissues and blood serum under the influence of anesthetics. In the case of rabbits, New Zealand cabbage is stated to possess goitrogenous properties to a smaller degree than American cabbage.—C. E. Hercus and H. A. Aitken, *Brit. J. Hyg.*, 33:55 (Jan.), 1933.

**Effect of Irradiated Ergosterol After the Removal of the Parathyroid Glands from Rats**—These experiments were made to test the efficacy of moderately large doses of irradiated ergosterol given over a long period of time in preventing growth differences between normal rats and those from which the parathyroids have been removed. Two series of animals were studied—one in which the parathyroids were removed at 50 days of age and in the other at 75 days of age. The parathyroidectomized rats which were fed on the Steenbock stock ration without the milk supplement until 150 days of age showed no change in water, lipid, or ash content of their femora or humeri as compared to the normal control. The blood calcium of the animals was somewhat below normal at the end of the experiment and 8 of 21 rats so treated showed weakness, stiffness of the rear legs, tetany, and decreased rate of growth, and in some instances actual loss of weight. Three of these animals died during the experimental period.

Another series of parathyroidectomized rats, which received irradiated ergosterol solution (1000 D) incorpo-

rated into the ration at a 1 per cent level, failed to maintain normal concentration of blood calcium, and 2 of the 21 animals showed loss of weight, general weakness, and stiffness of the rear legs, but no tetany. None of these animals died during the experiment.—Dorothy W. Asher and James H. Jones, *J. Biol. Chem.*, 100:333 (Mar.), 1933.

**The Fate of Tartaric Acid in the Human Body**—The fate of tartaric acid both in experimental animals and in the human body has been the subject of a great many studies and the view has generally been that tartaric acid is

oxidized in the body. The experiments reported here indicate that tartaric acid (sodium tartrate) is not utilized in the human body, neither is it transformed. When injected intramuscularly, tartaric acid reappeared almost quantitatively in the urine within 10 hours, the major portion being excreted within the first 4 hours. When taken by mouth, only about 20 per cent is eliminated in the urine, but from previous work reported it is probable that this portion of tartaric acid is destroyed in the intestinal tract by bacterial action.—Philip Finkle, *J. Biol. Chem.*, 100:349 (Mar.), 1933.

## EDUCATION AND PUBLICITY\*

**A**N absence from the city made it impossible to prepare the usual quota of copy for this department. This offered an opportunity for submitting the article which follows—an attempt to picture the status and some of the relationships of popular health education as practised in the United States and Canada.

*Readers are invited and urged to send criticism or correction of facts and ideas, and to point out inadequacies in the presentation. Enlargement of some of the points made would be welcome.*

**HEALTH** Education for Adults and Young People Not in School or College—is directed toward three diverse objectives: (1) improvement of the habits of individuals which affect their health, (2) improvement of family and community conditions which have such an effect, and (3) creation of such understanding of official and voluntary health agencies by the public as will insure the support of their policies and the maintenance of their activities. For the subject of health

education related primarily to the school child see Health Education for Children (in *Social Work Year Book*).

Health education in the classroom may be and usually is more continuous, systematic, and progressive than is possible elsewhere. But popular health education bears part of the responsibility for the school child through its service in teaching the parent and the community. The school activities, moreover, are supplemented by the health education programs, of varying effectiveness, provided by numerous agencies concerned with the interests of boys, girls, and young people. Much is accomplished by practising phy-

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to ERIC G. ROUSSEAU, 130 East 22d St., New York, N. Y.

sicians and nurses in homes and at clinics, and by other professional visitors to those in need—social case workers, dietitians, or visiting housekeepers, and somewhat systematic instruction is also given in mothers' conferences or classes. The threefold objective must usually be sought, however, through less direct channels.

*Types of Participating Agencies*—Responsibility for general and specialized programs of health education is widely distributed, national, state, and local agencies, both public and private, sharing in the work. To some extent county and state medical societies carry on active campaigns of education, and the American Medical Association has its capably directed Bureau of Health Education, and *Hygeia*, its popular health magazine. Many mediums are used and coöperative relationships are established for the purpose with many non-health organizations. For several years the Chamber of Commerce of the United States has offered a group of awards annually to cities for their public health work, and effective health education is given recognition in these awards. The General Federation of Women's Clubs and various state federations have promoted campaigns for better personal and community health, and all national and social agencies in the character-building group have health education programs. In fact, almost any of the many types of organizations into which men, women, and young people group themselves may undertake work in this field. Sometimes they are stimulated by their state or national organizations. Frequently an energetic individual, aroused by his experience with some health agency, organizes one or more health talks, the showing of motion pictures, or the distribution of printed matter.

Various types of social agencies, furthermore, have included health edu-

cation with individuals, groups, and the community as an essential means for carrying out their primary purposes. For example, much of the earlier program against tuberculosis was organized in family welfare societies. Business houses, trade groups, and life insurance companies issue some of the best prepared and most attractive health education material that is published. On the other hand, much unsound advice and some that is extremely vicious and disastrous is given by a few firms which use a health appeal in their advertising. The National Better Business Bureau supplies newspapers with information about the fraudulent health claims of advertisers, and the American Medical Association, the Information Bureau of the New York Academy of Medicine, and similar agencies are increasingly called upon by publishers to check the validity of such claims.

*Difficulties Faced, and Means Employed*—Popular health education faces wide differences in the intelligence of its audience and in the needs or resources of the individuals who constitute that audience. Moreover, a real motivating interest in the subject is lacking, as witness the slow response to the diphtheria prevention campaigns in spite of parental love as an incentive. Though the disease is easily preventable to almost 100 per cent, and adequate provision is made for free treatment where needed. It nevertheless requires intensive campaigns of education, supplemented by aggressive organized efforts, to have children taken to physicians or clinics for inoculation. The patent medicine bill of the United States, according to *Business Week*, was \$472,000,000 in 1929. The total annual expenditure for public health by governments and philanthropy, as given in the final report of the Committee on the Costs of Medical Care, is \$121,000,000.

In health education programs prac-

tically all known methods for getting attention, spreading information, and stimulating action are utilized. The diversity of need implied by the three-fold objective gives opportunity for a wide range of method. The newspapers have served public health education more than any other group of coöperating agencies. They have been the chief reliance of many health departments and many voluntary health agencies, and in numerous times of emergency they have been the main channel for reaching the public.

Next to the newspaper the radio continues as the obvious channel for community-wide efforts, plus the intensive campaign, promoted locally or nationally. Unfortunately there is little check upon what the unscrupulous may urge or claim through radio broadcasts. The early diagnosis campaigns of the tuberculosis associations are nationally promoted, as are the campaigns for promoting safety. See *Safety Education and Tuberculosis*. Health Weeks in various forms are frequently organized locally, and sometimes, as in Illinois, on a state-wide basis. Epidemics and similar emergency conditions usually lead to intensive campaigns directed toward the general public. But there is a growing trend toward planned year-round programs, based on studies of needs and resources. The Public Health Education Section of the American Public Health Association is contributing to this end. On the whole there has not been significant progress in frankly facing the complex situation and working out programs of progressive, cumulative presentation which might make headway in the midst of the competition.

Gratifying progress has been made, however—particularly within the past ten years—in the effectiveness of methods and materials used by health agencies. More and more they have learned to employ the arts and skills

which result in the preparation of readable and effective printed matter. The spoken word is also used more skilfully, and other forms are better prepared and more effectively used. In this development the contributions of modern psychology have been drawn upon, but many workers have been too overwhelmed by the mass of their work to give much thought to the way of doing it.

*Evaluation, Leadership, and Training*—The weakest point in health educational work today is the lack of evidence as to results, or of means for testing the effectiveness of methods and materials. Two or three carefully controlled tests have been made in the social hygiene field, as reported in publications of the American Social Hygiene Association (*infra cit.*), but adequate and convincing evaluation of methods and results awaits the time when money and personnel are at hand for tests which shall extend over a period of years.

An important unsolved problem is that of leadership for coördinating the many varied educational projects. Nationally, in states, and locally, groups of general and specialized health agencies are spreading health information with little or no coördination of effort. Logically, leadership should rest with governmental agencies, and in a few instances health departments have capably accepted the responsibility. Hopeful developments also, in a few cities, are health councils in which both public and private health agencies of a community unite in organizing a gradually inter-related program of health service, including popular health education. See *Health Councils*.

A notable event in this field in 1932 was the publication of *Community Health Organization* (*infra cit.*) with the fullest presentation yet made of the scope and nature of an effective health education program for city health de-

partments. This book supplies what is possibly the first authoritative recognition of the fact that adequate salaries are needed for health education specialists in public health departments.

At present only a small proportion of health agencies employ staff members who are experienced in using the several technics required for the various forms of public health education. Training opportunities are few. Most of the professional public health training schools recognize health education only to the extent of a session or two in a broad course on public health administration. In the institutes for workers in tuberculosis conducted by the National Tuberculosis Association several sessions are devoted to forms of publicity or health education. At Washington, in October, 1932, the Public Health Education Section of the American Public Health Association enrolled 108 students in a 3-day institute. That section has been a vital factor in improving standards and in-

creasing understanding in the field. Its membership includes persons concerned professionally with public health education, and also health educators in schools and colleges who associate themselves with the public health field. "Education and Publicity," a department of *American Journal of Public Health*, has been useful as a clearing house of ideas and information.

The Social Work Publicity Council serves a large group in this field, particularly persons concerned with the technic of preparing printed and other materials for educational purposes. Of the awards made in 1932 for outstanding examples of publicity, 6 went to health agencies. Though health association conventions and social work conferences provide one of the best available channels for educating executives and staff workers on the job, there is a disappointing lack of consideration of adult health education topics on their programs.—Ewart G. Routzahn, *Social Work Year Book*. Russell Sage Foundation, New York, N. Y., 1933.

## PUBLIC HEALTH NURSING\*

### Public Health Nurses—Ratios to Population in Two States—

Wisconsin—A.P.H.A. Standard applied to Wisconsin—1 public health nurse to 4,400 people. Wisconsin ratio (exclusive of nurses employed by insurance companies and industrial concerns)—1 public health nurse to 8,750 people. Wisconsin ratio (exclusive of Milwaukee)—1 public health nurse to 10,089 people.

A.P.H.A. city of 100,000 population standard—1 public health nurse to

3,200 people. Milwaukee City—1 public health nurse to 4,800 people.

A.P.H.A. standard for cities of 50,000 where morbidity service is given—1 public health nurse to 2,800 people. Wisconsin cities offering preventive and morbidity service—1 public health nurse to 3,630 people.

A.P.H.A. ratio for rural nursing service—1 public health nurse to 6,000 people. Wisconsin ratio for rural nursing service—1 public health nurse to 17,800 people.—*Pub. Health Nurses' Bull.*, Bureau of Public Health Nursing, Wisconsin State Board of Health, 11 (Apr.), 1933.

Indiana—(Visiting Nurses employed

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

by insurance companies, and industrial nurses are counted in with other public health nurses in computing the ratio of nurses to population.)

There is 1 public health nurse to every 8,601 of the general population of the state; 1 public health nurse to every 5,780 of the urban population, and 1 to every 30,496 of the rural population.

**Bon Voyage for American Nurses!**—American nurses have been saving up their pennies to attend the Congress of the International Council of Nurses to be held in Paris, France, July 9 to 13, and in Brussels, Belgium, July 15 to 19. The last Congress was held in Montreal, Canada, in 1929.

The 23 countries whose nursing associations are affiliated with the I. C. N. are: Belgium, Brazil, Bulgaria, Canada, China, Cuba, Denmark, Finland, France, Germany, Great Britain, Greece, Holland, India, Irish Free State, New Zealand, Norway, Philippine Islands, Poland, South Africa, United States, and Yugoslavia.

Mlle. L. Chaptal of Paris is President of the I. C. N. and Clara D. Noyes of the American Red Cross Nursing Service is First Vice-President.

American Nurses scheduled to be on the program at the Congress are Effie Taylor, Nellie X. Hawkinson, Edith Potts, Stella Goostray, Mary Roberts, Elnora Thomson, Adda Eldredge, Laura Logan, and Shirley Titus.

Thomas Cook and Son—Wagon-Lits, Inc., are the official transportation agents for the Congress. Rates are \$123–\$139 for round-trip third class accommodations, to \$236–\$416 for round-trip first class accommodations, with tourist and cabin rates in proportion.

Many attractive tours are being planned through Europe both before and after the Congress.

Florence M. Johnson, 315 Lexing-

ton Avenue, New York, is the Chairman for the American Nurses' Association Transportation Committee of the I. C. N. and would like to have all nurses planning to attend the Congress, irrespective of the routes or tours they have chosen, notify her, as the French and Belgian nurses are anxious to know as soon as possible how many nurses to prepare for.—*News, Am. J. Nurs.*, XXXIII, 3:278–282 (Mar.), 1933. *Ibid*, XXXIII, 4:386 (Apr.), 1933.

**An Opportunity for Public Health Nurses in the Middle West**—The American Child Health Association announces that its seventh Health Education Conference will be held at Ann Arbor this year from June 20 to 24 at the invitation of the University of Michigan Summer Session.

Experiences during the last 3 years in all phases of the school health program will be used in the discussions with the expectation of arriving at helpful conclusions for present situations.

Dr. John M. Sundwall of the University of Michigan is general chairman and he and his local committee are making all housing arrangements. Efforts are being made to reduce the living cost to a minimum.

Many public health nurses will be glad to spend this week at Ann Arbor and freshen up on health education problems by discussion and contact with leaders in that field. Nurses planning to attend summer school will have time in most cases to attend this conference before they begin classes.

While discussions in this conference will center around the school child and be of most vital interest, perhaps, to public health nurses working with school children, still all public health nurses are teachers and engaged in health education work and it may be that visiting nurses and infant welfare nurses will learn even more from this conference than school nurses.



## BOOKS AND REPORTS

**Recent Social Trends in the United States—*Report of the President's Research Committee on Social Trends in the United States, with a Foreword by Herbert Hoover, 2 Vols.***  
New York: McGraw-Hill, 1933.  
1568 pp. Price \$10.00.

In December, 1929, President Hoover appointed a group of eminent scientists to undertake a national survey of social trends in the United States. This report is the result. In view of the nature of its task, President Hoover observes in the foreword that the committee places emphasis on elements of instability rather than stability in our social structure. A summary of the findings is presented in 29 chapters prepared by experts, preceded by a comprehensive statement which represents the collective judgment of the committee regarding the material and its implications.

Modern life is everywhere complicated, but especially so in the United States, where immigration from many lands, rapid mobility within the country itself, the lack of established classes or castes to act as a brake on social changes, the tendency to seize upon new types of machines, rich natural resources, and vast driving power, have hurried us dizzily away from the days of the frontier into a whirl of modernisms which almost passes belief.

The committee has endeavored to portray the bewildering confusion of the problems as the members uncovered the situation, and in contrast with certain national committees, has not attempted to make recommendations regarding future organization except in a general manner.

Along with amazing mobility and complexity, note is made of a marked indifference to the interrelation among the parts of our huge social system.

The outstanding problem might be stated as that of bringing about a realization of the interdependence of the factors of our complicated social structure, and of interrelating the advancing sections of our forward movement so that agriculture, labor, industry, government, education, religion and science may develop a higher degree of coordination in the next phase of national growth.

One of the many values of this report is the assembly and interrelation of the many factors and elements in the social life of America.

Of the great social organizations, the economic and governmental are growing rapidly, but two other historic organizations, the church and the family, have declined in social significance, although not in human values. It is believed that many of the problems of society occur because of the changing rôles of these four major social institutions. The importance of viewing social situations as a whole is emphasized.

Effective coordination of the factors of our evolving society mean, where possible and desirable, slowing up the changes which occur too rapidly and speeding up the changes which lag. The committee does not believe in a moratorium upon research in physical science and invention, such as has sometimes been proposed. On the contrary, it holds that social invention has to be stimulated to keep pace with mechanical invention. What seems a welter of confusion may thus be brought more closely into relationship with the other parts of the national structure, with whatever implications this may hold for ideals and institutions.

The problems affected by social change are considered under three groups: man's physical heritage, biological heritage, and social heritage—or cultural environment called civilization.

The declining rate of population growth and its significance, the distribution and quality of population, are con-

sidered in detail. Relative to practical possibilities of improving a people by conscious selection, it is suggested that in time higher eugenic ideals may emerge from research on this question; but more immediately urgent is the need of preventing individuals with undesired inheritable traits from having offspring.

The amelioration of conditions of poverty, disease, and crime, and other distressing problems occasioned by inequalities of life, such as ignorance, physical defects, family desertion, and unprotected children, is considered a major objective involving technics of modern social science and public welfare. While social insurance does not remove the cause of dependency, it may stimulate preventive measures.

The indications are that the United States in the near future will have to face the problem of providing more certainly and systematically for these ills which at all times, and particularly in periods of depression, have come to be a major task of public and private social work.

The practice of medicine is in a state of transition which is perhaps analogous to the state of industry during the early period of mechanization. There is a marked survival of traditional, individualistic practice, to which many physicians cling as did the early handicraftsmen seeing their independence and their creative skill threatened by the machine.

The serious dearth of physicians in rural districts, the rapid growth of medicine, and the place of the hospital and clinic are discussed. It is observed that medical organization has not changed as rapidly as scientific medical research, and that the concern of social policy regarding medicine is with the extent and direction of the development of different types of organized medicine.

The problem is to make available to the whole people the results of scientific research and experiment at a reasonable cost.

In a brief review, it is impossible to do justice to such a comprehensive re-

port of an exhaustive national study of this important problem. An enormous amount of valuable information has been assembled in a manner to stimulate those in responsible positions to consider carefully their program developments and their place in community life.

IRA V. HISCOCK

**Chronic Enteric Carriers and Their Treatment**—By C. H. Browning, with H. L. Coulthard, R. Cruickshank, K. J. Guthrie, and R. P. Smith. *Special Report Series, No. 179, Medical Research Council, London, 1933.*

Although the morbidity and mortality rate of the enteric fevers—typhoid and paratyphoid A and B—is at present very low in Great Britain, the authors appreciate the fact that such a fortunate situation is due to the hygienic conditions and that a potential source of danger is ever present in the chronic carrier. Their report, including a thorough review of the literature and results of personal researches regarding this subject, is divided into 3 parts—(1) Classification of Carriers: Incidence and Importance, (2) Methods of Laboratory Identification, and (3) Treatment of Enteric Carriers. An appendix gives the histories and records of tests on the carriers studied in the investigation.

Carriers can only be classified when laboratory records are available for as long as a year after clinical recovery since a considerable number of persons excrete the specific organisms for short periods and become cured spontaneously. In most cases, the individual who excretes bacilli after 6 months will continue to do so, and those who are shown to eliminate the organisms after 1 year are classified as chronic or permanent carriers.

More women than men become carriers, and various states of health are observed. The carrier may harbor a

focus in the intestinal canal, gall-bladder, bile ducts or liver tissue, urinary tract, bone marrow, or tonsils, from which the bacilli are often discharged intermittently. The control of the carrier state, which apparently is not affected by previous vaccination, becomes one of personal and community responsibility.

Positive identification of the carrier depends upon the isolation of the specific bacilli. A combination of direct plating on a differential medium such as MacConkey's or Endo's agar and the use of broth containing brilliant green in varying concentration gives the greatest number of positive results.

Widal tests with a proper consideration of O agglutinins are often informative. Complement fixation reactions, skin tests, and blood studies are sometimes significant.

Non-surgical methods of treatment—chemotherapy, physiotherapy and alteration of intestinal flora—of the chronic carrier have proved ineffective. "Operative treatment has now been carried out sufficiently often to show that it offers high likelihood of cure." Removal of the gall bladder where that organ has been proved to be the site of infection, has yielded highly satisfactory results. Three biliary carriers—one of whom submitted to cholecystectomy and two to cholecystgastrostomy—were cured by such surgical procedures. Urinary carriers who are proved to have an unilateral focus are often cured by operative treatment.

As a whole, the chronic carrier has little assurance of a cure.

ANNA DEAN DULANEY

**Housing Objectives and Programs**  
—*The President's Conference on Home Building and Home Ownership. Washington, 1932. 345 pp. Price, \$1.15.*

This publication of the President's Conference on Home Building and

Home Ownership is a summation of work of the Conference and points toward future activities in behalf of the home owner.

The committee on technological developments concludes its discussion with specific recommendations regarding construction of homes at less cost. Its first conclusion indicates a belief that small houses at the present time do not meet reasonable requirements for cost, safety and comfort, and discusses how these shortcomings may be removed.

The committee on legislation and administration approaches the reports of each of the sub-committees of the Conference with the idea of indicating where additional legislation or rulings might be useful. The committee on standards and objectives of housing sets forth a very complete and interesting resumé of its topics. Much consideration has been given to details of homes and home building. Two others of these major committees concern themselves with indicating generally how the good results of the Conference can be brought to the attention of all those interested and how these results can be crystallized into local and national programs for the advancement of the cause. The section concerning research lays out many fields in which additional effort can be directed and points to the value of a privately endowed housing foundation. ARTHUR P. MILLER

**Fungous Diseases. A Clinico-Mycological Text—By Harry P. Jacobson, M.D. Springfield, Ill.: Charles C. Thomas, 1932. Price, \$5.50.**

The need for a concise study of clinical mycology and the greater interest in the subject in the United States is indicated by the publication during the last 2 years of several books dealing with fungous diseases. This work is concerned chiefly with clinical

mycology, and is intended primarily for medical students and physicians. Until recently, material in the fields of both medical mycology and industrial mycology has been scattered through various American and European textbooks and periodicals.

The author divides the material on fungus diseases into 3 sections, based on the location of the primary lesion and the frequency of systemic involvement. The first section is preceded by a chapter in which there is a brief historical sketch on the origin of mycology, and a number of definitions pertaining to structures of fungi. Section A considers those dermatomycoses which are "Primary cutaneous mycoses with (usually) no definite systemic involvement." The clinical signs, gross and microscopic appearance of cultures, and laboratory procedures for the diagnosis of saprophytic and parasitic dermatomycoses are described. Information concerning the form of the organism in culture, the appearance of the surface, color, location of human lesion, morphology of organisms from lesions, and pathogenicity for animals is given in tabular form for the *Microspora*, *Trichophyta*, *Epidermophyta* and *Achoria*. The diagnosis, differential diagnosis, therapy, and prognosis of these infections is discussed.

In Section B, "Primary cutaneous and/or mucous membrane infections, with frequent systemic involvement" are discussed. These include moniliasis, maduromycosis, sporotrichosis, blastomycosis, actinomycosis and coccidioides. These infections are discussed under the same headings as are those of Section A, and the pathological changes produced are described. A short history of each disease, as well as its distribution, is included in most cases.

It is unfortunate that the author has adhered so rigidly to the use of some of the older terms in classification, particularly in the use of the generic terms

*Blastomyces* and *Nocardia*, for the causative agents of blastomycosis and actinomycosis. In the case of blastomycosis, it has been pointed out by others that the term was originally used because the organism was thought to be a yeast, although erroneously. The term *Blastomyces* has also been used by some mycologists for one of the *Fungi Imperfecti*. The causative agent of most cases of clinical "blastomycosis" conforms to the requirements of the genus *Oidium*, and this generic name should therefore replace the older one. Although there may be justification for the division of blastomycosis into different clinical types, it is questionable whether these are caused by different species of *Oidium*. In fact, 3 main types of growth which have been described for *Oidium dermatitidis* can be obtained from a single culture by varying the medium and examining the cultures at different ages.

The use of the generic term *Nocardia* for the causative agent of actinomycosis is unsuitable for several reasons, which were discussed by Breed and Conn in an article published in 1919.

Torulosis and Aspergillosis are discussed in Section C which deals with "Primary systemic infections with occasional instances of skin or mucous membrane involvements." While the author makes no claim for the comprehensiveness of this volume, there are some fungous diseases of interest which are omitted, notably infection with *Mucor corymbifer*. Infections of this type would logically fall in the third section of the text.

There are some inaccuracies. On page 125, the causative organism of sporotrichosis is incorrectly described as being Gram-negative when found in the tissues. In only one place has the author mentioned the industrial relationships of the fungi, and it would probably have been better to have

omitted this reference to the commercial use of *Aspergillus niger*, for it is not generally considered as capable of producing pyrogalllic acid, and is certainly not used commercially for this purpose.

The volume is especially well illustrated and printed on excellent paper. It is well written and will be welcomed by clinicians who will be glad to have the information presented in a single volume.

NEWELL R. ZIEGLER

**The Development of Mental Health in a Group of Young Children:** An analysis of factors in purposeful activity—By *Elizabeth Skelding Moore*. *University of Iowa Studies in Child Welfare*, Vol. IV, No. 6, 1931. 128 pp. Price, \$1.50.

A unique method of investigation has been applied in this study to determine child behavior under varying conditions of child-child, parent-child, and teacher-child contacts. Five aspects of mental life have been studied, namely, initiative, creative ability, perseverance, poise, and friendliness. Three groups of preschool children were enrolled for this research: the main group, consisting of 20 children of 2 and 3 years of age; a second group, composed of 22 children around 4 years of age, for supplementary data; and a third group, composed of 19 children from 2 to 4 years of age, under observation 5 days a week from 9:00 a.m. to 4:00 p.m.

The methods of approach to the problem are stated as follows:

1. Controlled, experimental conditions were set up wherein each child could be observed for his activities and reactions with certain play materials and the results compared. These conditions were set up for each child twice during the year, a semester intervening.

2. A rating scale, providing for judgments on items of child behavior, was scored twice a year by each adult who was familiar with the children.

3. Daily checking for 22 weeks by 3 teachers of all the activities of each child where

adult assistance was needed, a double entry method permitting the recording of the teacher's method of aiding the child in each instance.

4. Observation of each child for a period of 1 hour during the preschool morning about every 2 weeks until 10 hours of observation were made.

5. Visits to the home of each child over a consecutive period of 48 hours.

Some of the main conclusions to this study may be noted.

1. It is clear that children as young as 2 and 3 years of age have already established very different patterns of behavior.

2. Some children exerted effort to attain their purposes, others little.

3. The creative activity varied as widely.

4. In self-reliance the children also varied.

5. In friendliness the same extremes in individual behavior were found on all of the methods used.

6. This study indicates that there are many differences in the environmental influences reacting upon individual children.

The general conclusion reached is that it is possible, through carefully controlled experiments and observations, to analyze various aspects of child behavior in its interaction with the environment. RICHARD A. BOLT

**The New Healthy Living Series—**By *Winslow and Hahn*. New York: Merrill, 1932. Price, Books I, II, III—\$.64; Book IV—\$.68.

Four books make up the latest *New Healthy Living Series*, which should prove valuable to teachers because of the excellent presentation of interesting subject matter, attractive illustrations, well chosen diagrams, and apt stories. Suggestive pupil activities in the form of questions, experiments, and problems, as well as tests for measuring the knowledge gained, will also appeal to the teacher.

The first book, *The Game of Healthy Living*, aims to develop a positive interest in or desire for health. Aliveness and growth are stressed, together with the part played by foods, sunlight, and exercise in maintaining them.

*The Habits of Healthy Living* follows logically as the second book, for the child must fix his health habits firmly at an early age. The approach is clever, being the secret of the successful adventures of Lindbergh, Byrd, and Piccard—careful preparation and control based on habit formation.

The reasons for health habits are brought out in the third book, *The Laws of Healthy Living*, which is perhaps slightly technical in its physiology for the elementary school, but nevertheless very readable and sound.

In the last book of the series, *The Healthy Community*, the emphasis naturally broadens to public rather than personal health and presents a fascinating picture to the reader by showing the contributions of such health heroes as Pasteur, Trudeau, and Walter Reed.

This series is scientifically accurate in subject matter, with the possible exception of one or two overstatements of facts still open to debate, such as the harmful effects of tobacco upon the appetite, digestion, and heart. One or two statements concerning Oriental diet and clothing would also bear investigation. The advice given is in general sane and practical. The books are carefully planned and well executed, so that they should prove decidedly useful to teacher and pupil alike.

MARGARET ROBERTS

Health Section Report of the Denver Meeting—World Federation of Education Associations—Published by the American Child Health Association and the Metropolitan Life Insurance Company, New York, 1932, 300 pp.

This report is similar in nature to those issued from the previous meetings of the Health Section. It contains reports of school health programs or special and distinctive pieces of school health work in Australia, Belgium,

China, Czechoslovakia, England, Finland, France, Germany, India, Italy, Japan, Poland, Sweden, and the United States. Special sections are devoted to (1) nutrition and other phases of the school health program, (2) the integrated health program in elementary and secondary schools, (3) the health program in teacher education, (4) the health service program, (5) technique for developing sound health literature and other materials, and (6) activities promoting home and school coöperation. One of the sessions was a joint session with the Department of Home and School. The continuing program of the Health Section is described.

Through a contribution of funds and services from the Metropolitan Life Insurance Company and the American Child Health Association, this book has been carefully edited, attractively printed, and made available at printing costs. It reflects appreciable progress in the improvement of the school health program and particularly health education in the United States and in the other countries mentioned. It probably presents the best available picture of current school health activities throughout the world. Papers have been reduced to concise, meaty, but readable form.

Only a limited edition has been issued, so workers in health education and other phases of the school health program should secure a copy while the volume is still in print.

C. E. TURNER

The Chemistry of Tuberculosis—By H. Gideon Wells and Esmond R. Long. (2d ed.) Baltimore: Williams & Wilkins, 1932. 481 pp. Price, \$7.00.

This book, which serves as an excellent reference to the vast store of literature in the field that it covers, has been thoroughly revised. The volume is divided into 3 sections dealing with

the chemistry of acid fast bacteria, the chemical changes in the tuberculous host, and the chemotherapy of tuberculosis.

The review of the chemistry of acid fast bacteria is prefaced by a brief discussion of the recognized variations occurring in the typical bacilli usually associated with tuberculosis. The significance of these variants and their relation to the chemical investigation of laboratory cultures is well brought out. The first section has been improved by a more logical arrangement, and a wealth of new data on the composition of the bacillus and its metabolic products is now presented. It includes studies on the nutritional requirements of the tubercle bacillus, the composition of representative organisms of all the principal types of acid fast bacilli, and the chemical composition of tuberculin. A discussion of the factors regarded as responsible for the property of acid fastness forms an interesting chapter.

The second section considers the chemical changes in tuberculous tissues and the chemical properties of the various fluids and excretions of the tuberculous host. The collection and correlation of the information relative to the blood, effusions, sputum, and urine in tuberculous individuals constitutes one of the notable features of the book. The chapter on the metabolism in tuberculosis should be of interest to every physician treating the disease.

The section on chemotherapy has undergone less alteration than the rest of the book—a rather striking illustration of the fact that research directed toward the cure of tuberculosis is seeking other fields. The rôle of calcium as a therapeutic agent is excellently presented and serves to clarify a highly controversial subject.

The excellent summaries at the end of the principal sections are very helpful, but the reviewer feels that the

value of the work would be enhanced by a more pointed evaluation of the various data presented throughout the volume. The student might also wish to find a more thorough review of the chemical aspects of immunity in tuberculosis—a subject which the authors are preëminently fitted to discuss.

The book is comprehensive, lucid, and unusually well edited. It should be a constant companion of every student of tuberculosis.

DONALD E. CUMMINGS

*Water Purification Control—By Edward S. Hopkins. Baltimore: Williams & Wilkins, 1932. 131 pp. Price, \$1.75.*

This short, non-technical guide in water purification plant control fills a current need. With the exception of one chapter on plant control data, it explains the processes involved in water purification, and the application of the various chemicals used therein.

ARTHUR P. MILLER

*Standard Methods for the Examination of Water and Sewage, Seventh Edition—By the American Public Health Association and the American Water Works Association. New York: 1933. 180 pp. Price, \$2.00.*

The manual as a whole has been considerably enlarged by the addition of new chapters in chemical and microscopical methods and by the inclusion of a new feature, that of non-standard methods both chemical and bacteriological which have not as yet had sufficient use to warrant their adoption as standard methods. The table of contents with its new grouping of subject material is more concise and more easily available than in previous editions.

In view of the growing tendency to consider microscopic examinations of bottom sediments and plankton a valu-

able source of information as to the sanitary status of a sewage-polluted stream, the revision and enlargement of this section of the manual should prove a timely aid to those interested in stream control work.

In the chemical section a few new methods have been added, a few omitted, and some, such as total hardness, turbidity measurements, and quantitative estimation of chlorine, have been rewritten and revised. The biochemical oxygen demand method has been entirely revised and standardized in accordance with the present accepted procedures as recommended by the joint B. O. D. committee report.

A chapter on rapid methods of boiler water analysis is a step toward uniformity in this field.

Bacteriological standard procedure has been changed but little from previous editions. The brilliant green lactose peptone bile method in conjunction with standard lactose broth has been added for the control of waters in the process of purification. Whether this test, recommended for unfinished waters only, will prove to be a saving in time and a better index of plant conditions than the standard method remains to be reported upon by plant operators.

The printing and arrangement of the manual make for a readable, usable laboratory guide, and on the whole this seventh edition seems to have fulfilled admirably its attempt to revise and standardize the older procedures and to include only the best and most promising of the newer methods.

ALICE EXWORTHY

*Farm and Village Housing—The President's Conference on Home Building and Home Ownership—Vol. VII. Washington, D. C., 1932. 293 pp. Price, \$1.15.*

This volume deals with the special problems of housing and environment presented by farms and rural communi-

ties in direct contrast with city housing problems.

The book is divided into several parts, dealing successively with existing farm and village housing conditions; existing design and construction with suggestions for improvement and for building new houses; farm beautification; economic and financial aspects, including values of dwellings, financing building and improvements, taxation, and insurance problems, special phases and problems, which include housing and health and migratory labor; educational objectives and methods, needed research programs, and recommendations.

Various appendices give the activities of several rural organizations, housing conditions among the Indians, and a list of references.

The volume brings out forcibly the low value of rural dwellings in different sections of the country and points out that architects in general have overlooked the special needs of farmhouses in designing single-family dwellings. Also, that a lower cost structure is needed compared with prices of city dwellings. Too much territory has been covered in too short a time and consequently parts of the book are rather sketchy. The volume will, however, serve as a starting point from which further studies of rural housing and the peculiar problems attendant thereto may be made.

VINCENT B. LAMOUREUX

*The Rheumatic Infection in Childhood—By Leonard Findlay, M.D. New York: Wood, 1932. 187 pp. Price, \$3.50.*

Written by a man with long service as physician to the Royal Hospital for Sick Children of Glasgow, this book carries the authority of careful observation and ample experience. The basis of the treatise rests on 701 cases of rheumatism, of which all but 8 have



been completely followed up, some having been under observation for 15 years.

Each of the various manifestations of rheumatism has a chapter to itself and there is a chapter on prognosis and one on treatment. There is a good bibliography at the end of each chapter, particularly in respect to European references.

For the clinician in the public health field this book will be of considerable interest. MERRILL E. CHAMPION

Planning and Building the City of Washington—*Edited by Frederick Haynes Newell. Washington, D. C.: Rensdell, Inc., 1932. 254 pp. Price, \$2.00.*

The planning and building of the city of Washington are presented in this small book, a product of the efforts of the Washington Society of Engineers and coöperating agencies and persons. It is well illustrated and contains much of interest to those desirous of seeing L'Enfant's vision carried through.

ARTHUR P. MILLER

## BOOKS RECEIVED

THE EXAMINATION OF WATERS AND WATER SUPPLIES. 4th Ed. By John Clough Thresh, John Foster Beale and Ernest Victor Suckling. Philadelphia: Blakiston, 1933. 824 pp. Price, \$9.00.

TOWARDS MENTAL HEALTH. The Schizophrenic Problem. By Charles Macfie Campbell. Cambridge: Harvard University Press, 1933. 110 pp. Price, \$1.25.

BROADCASTING HEALTH. By J. Mace Andress and I. H. Goldberger. New York: Ginn, 1933. 401 pp. Price, \$.80.

SOCIAL PLANNING AND ADULT EDUCATION. By John W. Herring. New York: Macmillan, 1933. 138 pp. Price, \$1.25.

UNIVERSITY TEACHING BY MAIL. By W. S. Bittmer and H. F. Mallory. New York: Macmillan, 1933. 355 pp. Price, \$2.50.

HOLLOW FOLK. By Mandel Sherman and Thomas R. Henry. New York: Crowell, 1933. 215 pp. Price, \$2.00.

A NEW APPROACH TO DIETETIC THERAPY. By Eugene Földes. Boston: Badger, 1933. 434 pp.

SOCIAL WORK YEAR BOOK. 1933. Editor, Fred S. Hall. New York: Russell Sage Foundation, 1933. 680 pp. Price, \$4.00.

THE PHYSIOLOGICAL EFFECTS OF RADIANT ENERGY. By Henry Laurens. New York:

Chemical Catalog Co., 1933. 610 pp. Price, \$6.00.

PEACE OF MIND AND BODY. By William S. Walsh. New York: Dutton, 1933. 249 pp. Price, \$2.50.

PROCEEDINGS OF THE THIRTY-EIGHTH ANNUAL CONVENTION OF THE AMERICAN SOCIETY OF MUNICIPAL ENGINEERS. Detroit, Mich., Jan. 16-18, 1933. St. Louis: American Society of Municipal Engineers, 1933. 696 pp. Price, \$7.50.

THE FIRST TWO YEARS. A Study of Twenty-Five Babies. Vol. II. Intellectual Development. By Mary M. Shirley. Minneapolis: University of Minnesota Press, 1933. 513 pp. Price, \$3.00.

WATER PAGEANTS. Games and Stunts. By Olive McCormick. New York: Barnes, 1933. 138 pp. Price, \$2.00.

SELECTED RECREATIONAL SPORT FOR GIRLS AND WOMEN. By Julia H. Post and Mabel J. Shirley. New York: Barnes, 1933. 132 pp. Price, \$2.00.

LABORATORY MANUAL. Methods of Analysis of Milk and Its Products. Compiled by International Association of Milk Dealers, 228 North La Salle St., Chicago, Ill., 1933. 461 pp. Price, \$5.00 to members, public health officials and colleges. \$7.50 to others.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Immunization by Clinic and Practitioner**—These conclusions are reassuring: "In the 26 communities studied, those showing the highest public immunization rate against diphtheria show also the highest private immunization rate (judged by numbers of ampules distributed to practising physicians). . . . Those communities doing the most . . . immunizations show the greatest improvement over seven years in the incidence of diphtheria."

ANDERSON, G. W. and BIGELOW, G. H. Diphtheria Immunization and the Private Practitioner. *New Eng. J. Med.* 208, 15:781 (Apr. 13), 1933.

**Nurses Stimulate Diphtheria Immunization**—Diphtheria mortality in Chicago has been reduced by having nurses call on all children's parents urging that the immunization be done by the family physician. The church has proved a potent aid in dealing with foreign-born groups. Literature is a valuable aid to nursing calls. By itself it will not have much effect.

BUNDESEN, H. N. *et al.* Diphtheria Control in Chicago. *J.A.M.A.* 100, 14:1093 (Apr. 8), 1933.

**The Statistician Looks at the Heart**—Study of 2,000 cases of heart disease revealed an average age of 51, with males younger than females. The causes were rheumatic infection, 27 per cent; hypertension, 20 per cent; arteriosclerosis, 8.8 per cent; syphilis, 4.6 per cent. Other suggestive findings are recorded.

DEPORTE, J. V. Heart Disease in General Medical Practice. *Am. Heart J.* 8, 4:475 (Apr.), 1933.

**The Truth about Phage**—The reasons for the lack of therapeutic re-

sults following the administration of phage in experimental animals are thoroughly explored. Hopeful phage proponents will get no comfort from this summary.

EVANS, A. C. Inactivation of Antistreptococcus Bacteriophage by Animal Fluids. *Pub. Health Rep.* 48, 16:411 (Apr. 21), 1933.

**Possibilities in Rural Sanitation**—What has been done to improve community sanitation in Cattaraugus County is recounted in interesting detail.

FULLER, N. M. What a County Unit Can Accomplish in Public Health Engineering. *Municipal Sanitation* 4, 4:119 (Apr.), 1933.

**Measles Prophylaxis with Adult Blood**—During a measles epidemic the use of 10 c.c. of whole blood, preferably from a parent, will modify but not prevent the disease, reduce the incidence of complications, and the resulting immunity from the attenuated infection will be permanent. Much larger amounts of blood are necessary to protect.

KAISER, A. D. Value of Immune Adult Blood in the Treatment of Measles. *New York State J. Med.* 33, 8:521 (Apr. 15), 1933.

**American Experience with BCG Vaccination**—"1. Our 5-years' study on 413 BCG vaccinated babies indicates that BCG vaccination is harmless. 2. The vaccinated children show a lower tuberculosis mortality than similar controls. . . . 5. Parenterally vaccinated children become tuberculosis positive in 84 per cent of the instances, whereas the orally vaccinated children become so only in 40-50 per cent of the cases. . . . 7. As a whole, the parentally BCG vaccinated children show the lowest tuber-

culosis mortality of all the groups."

KERESZTURI, C. *et al.* Clinical Study of BCG Vaccination. *New York State J. Med.* 33, 6:375 (Mar. 15), 1933.

**Possibilities in Prophylaxis—**Brief and timely is this simply written summary of the use of biologicals in the prophylaxis and treatment of diphtheria, scarlet fever, tetanus, meningitis, pneumonia, poliomyelitis, measles and typhoid. It even explains the difference between a vaccine and a serum, which still remains a mystery to many sanitarians.

LONG, P. H. Communicable Diseases. *Am. J. Nurs.* 33, 4:303 (Apr.), 1933.

**Dissertation on Spinach of Many Varieties—**Spinach is found to contain a large part of the alphabet. Mothers are thereupon made to believe, not that spinach is wholesome, but that it is an indispensable part of the child's diet. The child is goaded into eating an unpalatable mess, or into open rebellion. "There are too many dictatorial statements made about spinach and kindred matters," says the author. "Other matters" in this instance represent the spinach in mental hygiene.

MYERSON, A. Sanity in Mental Hygiene. *Ment. Hyg.* 17, 2:218 (Apr.), 1933.

**A Poser for BCG Vaccinationists—**Apparently the opinion that infected individuals are protected against tuberculosis must be abandoned, for primary tuberculosis infections which produce allergy to tuberculin do not prevent consumption from developing later. Then, concludes the author, "Active immunization against tuberculosis with attenuated bacilli may not be a safe

procedure if this method immunologically duplicates the changes that accidental human contact infection produces."

STEWART, C. A. Does a Primary Tuberculous Infection Afford Adequate Protection Against Consumption? *J.A.M.A.* 100, 14:1077 (Apr. 8), 1933.

**Truth About Toddlers—**Candor and good common sense applied to the preparation of the child for life in school set this paper apart. It should be read and pondered over. Vaccination, tonsillectomy, tooth-building, nutrition, handicaps and posture all come in for critical scrutiny. An excellent paper.

ROGERS, J. F. Preparing the Child for School. *Pub. Health Nurs.* 25, 5:257 (May), 1933.

**Male Birth Ratio Increases—**The male sex-ratio for Canadian births is 105-106. Stillbirths, in which the male sex-ratio is much higher, are declining; hence there is an increasing ratio among the live-births. Other interesting statistical findings are recorded.

WYLLIE, J. Sex Differences in Infant Mortality. *Canad. Pub. Health J.* 24, 4:177 (Apr.), 1933.

**Pointing the Main Chance for Infant Mortality Improvement—**New York City's infant deaths studied in relation to place, age period, and causes reveal the usual findings and raise the question whether better obstetrics might not be the most potent measure for improvement.

WYNNE, S. W. Why and Where our Babies Die. *Quart. Bull.* (New York City Dept. of Health) 1, 1:1 (Apr.), 1933.

## NEWS FROM THE FIELD

### ADDITIONAL SUMMER SCHOOL COURSES

**I**NFORMATION from the following college came too late for the May issue. We therefore include it here for those interested.

*State Teachers College, Hyannis, Mass.*

July 5–August 11

Health Education

Handwork Projects for Mentally Retarded Classes

Modern Educational Theories and Practices

Principles of Teaching Health Subjects

Relation of Public Health Nursing to Social Service

Safety Education

School Nursing Procedures

Sociology

For further information, write the State Teachers College, Hyannis, Mass.

### NATIONAL TUBERCULOSIS ASSOCIATION

**I**N place of the course on Health Problems Involved in the Teaching of Fresh Air Classes, the course which the National Tuberculosis Association has been offering for the past 2 years at Teachers College, Columbia University, New York, a course on Health Problems and Protective Care will be substituted. Every school administrator, supervisor, and teacher is confronted every day with the problem of how to deal with children whose health is below par. It is not possible or practical to segregate in special classes all children needing "protective care," but it is both possible and practical to give these children found in every school, large and small, the "extra lift" needed to help them increase their resistance to infection and to improve their health status. The new course is planned to meet this problem. The course will be given from July 10 to August 18, 1933.

### MENTAL HYGIENE MOVEMENT

#### CELEBRATES

**O**N May 6, the 25th anniversary celebration of the mental hygiene movement was held in New Haven, Conn., where the movement was founded by Clifford W. Beers, a graduate of Yale, shortly after the publication of his autobiography, *A Mind That Found Itself*. A program was arranged under the joint auspices of the Connecticut Society for Mental Hygiene, which was organized by Mr. Beers in 1908, The National Committee for Mental Hygiene, of 450 Seventh Ave., New York, which he founded in 1909 and of which he is the Secretary, and Yale University.

Among the speakers were the Hon. Wilbur L. Cross, Governor of Connecticut; Dr. James R. Angell, President of Yale University; Dr. C.-E. A. Winslow, Professor of Public Health, Yale University; and Mr. Beers.

National mental hygiene societies are now in existence in 30 countries.

On May 11, the Gold Medal of the National Institute of Social Sciences was presented to Mr. Beers at the annual dinner of the Institute held in New York. In recognition of his work in the international field, the French Government has recently conferred upon Mr. Beers the Cross of Chevalier of the Legion of Honor.

### NORTHERN CALIFORNIA ASSOCIATION

#### ELECTS OFFICERS

**A**T its recent meeting, the Northern California Public Health Association elected the following officers:

*President*, Dr. Herbert F. True, of Sacramento; *President-Elect*, Professor Leon B. Reynolds, of Stanford University; *Vice President*, Eleanor Stock-

ton, of San Francisco; *Secretary*, Dr. Walter Brown, of Stanford University; and *Treasurer*, Mary Davis, of San Francisco.

#### MAX C. STARKLOFF

WE regret extremely to note the retirement of Dr. Max C. Starkloff from the position of Health Commissioner for the City of St. Louis. Dr. Starkloff was appointed first in 1895, and served until 1903. In 1911 he was again appointed, and has served to date. His first appointment was made 38 years ago, and he has actually served the city 30 years.

His administration has been marked by notable advances in the public health idea as well as his efficiency in applying new knowledge as it came forward. Soon after taking office came the disastrous cyclone of May 26, 1897. Within 6 hours after the storm, a vacant institution had been commandeered, equipped with emergency cots, and put into operation. For some 18 years this remained the City Hospital until new buildings were acquired.

Among Dr. Starkloff's notable accomplishments have been his constant fight for vaccination against smallpox. Through his aid, the City Board of Education maintained its rule for compulsory vaccination of all children within the public schools. The record shows that not one child ever contracted smallpox in the public schools.

Among his notable efforts was the fight against quacks, and he was successful in driving many charlatans out of the city. He was responsible for the establishment of 10 dental clinics. In 1914 he succeeded in obtaining an ordinance for the pasteurization of all milk, which failed to be upheld by the Supreme Court after many years of litigation. However, a new ordinance was passed, and at present the pasteurization of practically all milk in the city has been adopted. All milk sold in St.

Louis comes from tuberculin tested herds. St. Louis has the distinction of being the only city which authorizes the Commissioner to furnish dogs to the Medical Society for teaching and scientific purposes.

Under Dr. Starkloff's administration the department has grown from what might be called a small office engaged in the activities looking to the prevention of disease, to 16 bureaus: epidemiology, bacteriology, chemistry, vital statistics, food control, including milk, dairies, child hygiene, prenatal and postnatal work, dental prophylaxis, meat inspection (antemortem and postmortem), tuberculosis, venereal disease clinic and treatment, social service, public health education.

All honor to the veteran of public health who has accomplished so much during his years of public service. Fortunately for the city and public health in general, an excellent successor has been appointed. Further than this, all appointment in the Health Office are being recommended by a Board of Physicians and are made on the basis of quality and efficiency rather than politics.

#### INDIANA

THE long-awaited program of Governor Paul V. McNutt for the complete reorganization of the Indiana state government into 8 central departments became effective April 15.

With it came the grouping of approximately 100 state boards, commissions, bureaus, and departments into 8 major departments. Some departments that have been in existence for generations will lose their identity, others will be dispensed with, and still others will be merged.

Under the department of commerce and industry will fall the State Board of Health and its allied bureaus.

Many functions of the present board will be shifted to the Indiana University

School of Medicine. Through the discharge of 19 employees in the State Board of Health, Governor McNutt said more than \$33,500 would be saved annually. Among those holding important positions with the old board who will be dropped under the new scheme are Drs. William F. King, H. W. McKane, C. F. Adams, and Ada E. Schweitzer, all four Fellows of the A.P.H.A. Further changes in the health department will account for \$100,000 additional savings, the Governor said.

Dr. John H. Hare, Evansville physician, has been appointed executive secretary of the state board of health. Dr. Hare will succeed Dr. William F. King, who has been associated with the state health board many years as assistant and as secretary since 1925, when he succeeded Dr. William Hurty.

#### CHILD HEALTH ASSOCIATION CONFERENCE

AT the invitation of the University of Michigan Summer Session, the American Child Health Association will hold its seventh Health Education Conference at Ann Arbor, Mich. The conference will open on June 20 and close on June 24. Dr. John M. Sundwall, Director, Division of Hygiene and Public Health, University of Michigan, will be the General Chairman.

#### PENNSYLVANIA PUBLIC HEALTH ASSOCIATION MEETING

AT the Ninth Annual Meeting of the Pennsylvania Public Health Association, held at Wilkes-Barre, Pa., May 16 and 17, the following officers were elected:

President, C. B. Crittenden, M.D., Wilkes-Barre; Vice-President, James Smith, M.D., Erie; Secretary-Treasurer, A. J. Bohl, Harrisburg; Executive-Secretary, J. Clarence Funk, Harrisburg.

The Tenth Annual Meeting will take place at Philadelphia in May, 1934.

#### HEALTH DURING THE WORLD'S FAIR

PRECAUTIONS are being taken by the Chicago Health Department for health of the visitors to the Century of Progress Exposition during the coming summer. Particular attention will be paid to water and sewage disposal, purity of food and milk, examination of employees, and adequate comfort stations and drinking fountains. The department will have complete control over all other health matters.

The fair grounds will be under the same health supervision as the rest of the city. Tourist camping grounds within the city limits will also be under strict supervision, while outside camps will be under the control of state authorities. Tourist camps desiring the sponsorship of A Century of Progress must submit their plans for sanitary facilities and the control of communicable diseases to the Health Department for approval before any action will be taken by exposition officials. Food handlers have already been examined for communicable disease.—*J.A.M.A.* 100, 17 (Apr. 29), 1347.

#### TEXAS SHORT SCHOOL ON SWIMMING POOLS

THE Fifth Annual Short School was held at San Marcos, Tex., on May 6. It was devoted to the subject of Swimming Pools.

#### PARENTS-TEACHERS CONGRESS IN SEATTLE

THE 37th Annual Convention of the National Congress of Parents and Teachers was held at Seattle, Wash., May 21-26. The theme was The Child and His Community.

#### MARYLAND-DELAWARE ASSOCIATION

THE Seventh Annual Conference of the Maryland-Delaware Water and Sewerage Association was held in Baltimore, May 4 and 5.

#### CLOSING DATE FOR SUBMISSION OF FELLOWSHIP APPLICATIONS

ALL members desirous of applying for Fellowship are hereby advised that their applications must be transmitted to the Executive Office not later than August 10, if they are to be finally acted upon by the Governing Council at the Indianapolis Annual Meeting.

#### ACTIVITIES OF LEAGUE OF MENTAL HYGIENE IN BRAZIL

THE Brazilian League of Mental Hygiene, the tenth anniversary of which was recently celebrated, established in December, 1932, a mental hygiene clinic for children, the first of its kind in Latin America. This clinic, in charge of a physician assisted by psychologists, psychiatrists, and social workers, combines the work of a habit clinic for preschool children with that of a child guidance clinic for school children and emphasizes the prevention of mental disorders. The work with children under 2 years consists in watching their mental development; with children between 2 and 6 the purpose of the work is the formation of proper traits of mentality and personality; and with children between 6 and 12 the purpose is their correction and guidance.

The league is studying, through special committees, mental hygiene of children, social legislation, social aid, prevention of delinquency, and other subjects. It holds an anti-alcohol week every year, and is conducting a very extensive educational campaign through its literature and the daily press.—*Archivos Brasileiros de Hygiene Mental*, Rio de Janeiro, 1932, No. 2.

#### DEATH

DR. MARTIN DEWEY, former president of the American Dental Association, the Kansas City Dental Society, and the First District Dental Society of the State of New York, died May 14.

#### PERSONALS

CAREY P. MCCORD, M.D., F.A.P.H.A., of Cincinnati, O., was given his Honorary LL.D. on May 30, by Howard College in Birmingham, Ala., for his services in reducing the occupational hazards in the life of the industrial worker.

MILTON J. ROSENAU, M.D., Fellow A.P.H.A., Professor of Preventive Medicine and Hygiene at the Harvard University Medical School, Boston, will give two courses at the summer session of the University of California at Berkeley.

HENRY C. SHERMAN, Ph.D., Fellow A.P.H.A., in recognition of his research on food and his service in the training of chemists, has been awarded the medal of the American Institute of Chemists at the annual meeting of the institute in New York in May. The award is given each year for outstanding service to chemistry.

DR. WILLIAM B. GRAYSON, of McGehee, Ark., was elected Arkansas State Health Officer and secretary of the Board of Health, replacing Dr. Charles W. Garrison, who has served in the position 18 years.

W. W. PETER, M.D., Dr.P.H., Fellow A.P.H.A., formerly Associate Secretary of the A.P.H.A., has been granted an Oberlaender Trust Fellowship. He expects to sail on June 25 for 6 months in Germany and Austria, to study the visualization aspects of the public health education movement in those countries. In January, February, March, 1934, at the request of the Near East Foundation, he will make a survey of their medical and public health work in Albania, Bulgaria, Greece, Macedonia, Palestine, Syria, and Turkey. On behalf of American physicians in Persia, an invitation has also been extended to him to

visit medical and educational centers in that country in April. He expects to return to the United States by May 1, 1934.

E. S. GODFREY, JR., M.D., F.A.P.H.A., director of local health administration, New York State Department of Health, was elected president of the American Epidemiological Society at their annual meeting in Washington, D. C., on May 8.

HOMER N. CALVER, F.A.P.H.A., Secretary-Treasurer of the New York State League of Savings and Loan Associations, announces that the headquarters office of this League will soon be located at 30 Rockefeller Plaza, New York.

DR. JOSEPH F. BREDECK is the new Health Commissioner of St. Louis, Mo., replacing Dr. Max C. Starkloff, veteran public health officer, and Fellow A.P.H.A. Dr. Ralph L. Thompson has been appointed hospital commissioner replacing Dr. C. H. Lohr.

DR. EDWIN R. VANDERSLICE has been appointed director of the Lansing Health Department. He was for years director of the Michigan Tuberculosis Association.

DR. BYRON L. PAMPEL, of Livingston, Mont., was recently elected president of the Montana State Board of Health.

## CONFERENCES

June 2-3, Eighth Annual Meeting of the New England Health Education Association, Cambridge, Mass.

June 5-6, State and Provincial Health Authorities of North America, Washington, D. C.

June 5-6, State and Territorial Health Officers Conference, Washington, D. C.

June 11-17, National Conference of Social Work, Detroit, Mich.

June 12-17, Meeting of the American

Medical Association, Milwaukee, Wis. June 20-24, American Child Health Association Health Education Conference, Ann Arbor, Mich.

June 26-30, National Tuberculosis Association, Toronto, Canada.

June 26-30, Annual Meeting of the American Home Economics Association, Milwaukee, Wis.

June 27-July 1, Convention of the Association for Childhood Education, Denver, Colo.

June 28-July 3, International Hospital Congress, Knocke-sur-Mer, Belgium.

July 1-7, National Education Association, Chicago.

July 3-7, Association for Childhood Education, Denver, Colo.

July 3-8, British Social Hygiene Council Imperial Congress, London.

July 5-9, International Union of the Protection of Childhood, Paris.

July 10-15, International Council of Nurses, Paris, July 10-12; Brussels, July 13-15.

July 18-20, International Congress of Pediatrics, London.

July 19-22, International Society of Orthopaedic Surgery, London.

July 25-29, British Medical Association, Dublin.

July 29-August 4, World Federation of Education Associations, Dublin.

August, World Federation of Education Associations, Dublin.

September 27-28, Second European Reunion on Mental Hygiene, Rome.

November, 7th American Scientific Congress, Mexico City.

Spring, 1934, Statistical Conference, International Statistical Institute, London.

**Kellogg's**  
ALL-BRAN  
RELIEVES  
CONSTIPATION



# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

July, 1933

Number 7

## Diphtheria Immunization in Private Practice

GAYLORD W. ANDERSON, M.D., AND  
GEORGE H. BIGELOW, M.D., D.P.H., F.A.P.H.A.  
*Massachusetts Department of Public Health, Boston, Mass.*

DIPHTHERIA prevention through mass immunization in public clinics has become so generally accepted as a sound public health procedure that too little attention has been given to the part played by the physician in his family practice. It has been said that these clinics deprived the practicing physicians of the opportunity to carry out such immunization in their practice, inasmuch as the public would not pay the usual office fee for service obtainable free in a public clinic. On the other hand, certain physicians have testified that the conduct of an active diphtheria prevention campaign within a given city stimulated a demand for this service among their clientele. These conflicting views have almost invariably been based on personal opinions, adherents of both doctrines being found in all communities, and neither having anything but the most limited factual data to support the conclusions. In a previous communication\* we have given the results of a preliminary study designed to measure the extent to which the public conduct

of diphtheria immunization clinics may stimulate a demand for immunization in the private physician's office. In the present paper we have made further and more complete analysis of these data.

Although figures as to immunization clinics are relatively easy to obtain, it is virtually impossible to learn exactly the number of children that may be immunized in private practice. Lacking such information, we have used in this study the amount of toxin-antitoxin in individual doses supplied to the different communities under observation as an index of immunization in private practice.

In Massachusetts toxin-antitoxin is furnished by the State to all boards of health and physicians free of charge. This is supplied in vials of 20 c.c. for clinic purposes, and in packages of three 1 c.c. ampoules for office use by physicians. It has been assumed in this study that the use of these 1 c.c. ampoules has been limited to private practice. This assumption has been checked in certain of the communities using the greatest amounts, and found to be essentially correct. It is entirely reasonable that it should be, owing to

---

\* *New Eng. J. Med.*, Apr. 13, 1933, pp. 781-82.

the time that would be consumed were the individual ampoules used in a clinic. Thus we feel that within reasonable limits the use of such ampoules constitutes a rough index of the extent of immunization in private practice. There is, of course, the possibility that in some instances the large 20 c.c. vials may have been issued for an individual. Although such use has been denied by those boards issuing such supplies to physicians, it would certainly be a rather constant error from one community to another. To ignore such use, if it exists to an appreciable extent, is simply to underestimate the extent of private immunization and therefore to err on the side of conservatism.

Using the above mentioned assumption as a point of departure, we have studied the distribution of these ampoules for the years 1925-1931, inclusive, in all Massachusetts communities above 20,000 population, with the exception of Boston, Pittsfield, and Framingham. The city of Boston was omitted because its position as a center of a large metropolitan area can only mean that many of the ampoules credited to the city will have been used by Boston physicians for the treatment of children from suburban communities. The converse would hardly be true as relatively few Boston children are cared for by physicians with suburban offices. The number of ampoules taken from suburban distributing centers and used in Boston would then be small and fairly constant for all communities. Similarly constant would be the use of toxin-antitoxin ampoules in a community adjacent to that to which it was charged. The city of Pittsfield and the town of Framingham were likewise omitted from the study, due to the impossibility of obtaining sufficiently accurate figures as to immunization clinics.

There remain for study 35 cities and

towns with a total population slightly in excess of 2,000,000. The figures used in estimating the extent of immunization in public clinics are those furnished each year by the local board of health or school committee to the State Department of Public Health. The figures of toxin-antitoxin are those of recorded distribution from the State Antitoxin and Vaccine Laboratory at Forest Hills.

For purposes of comparison the average clinic immunization rate for each community for the 7 years under study has been computed, using as a rate the number of children immunized per year per 1,000 population. Relative immunization rate in private practice is calculated as the number of ampoules used per year per 1,000 population. Inasmuch as each child immunized means the use of three ampoules, the actual rate would be determined by dividing the relative rate by 3. The rate based on ampoules rather than on children immunized is preferable inasmuch as the differences between whole numbers can be more readily noted at a glance than differences between fractions, making the trend more easily recognized.

TABLE I  
AVERAGE DISTRIBUTION OF TOXIN-ANTITOXIN  
AMPOULES—ALL COMMUNITIES

<i>Average Clinic Immunization Rate per Year per 1,000 Population</i>	<i>Average Ampoules T-A-T per Year per 1,000 Population</i>	<i>Weighted Average Ampoules T-A-T per Year per 1,000 Population</i>
Less than 5	4.1	3.0
5-10	6.7	4.7
10-15	7.2	6.8
15-20	7.9	7.2
*20+	8.5	7.0

\* Many of these rates are of course in excess of the birth rate. This is possible only during the first few years of an immunization campaign.

In Table I is shown the use of ampoules in communities separated into 5 groups, according to public clinic

immunization rates. The average use of ampoules for the several communities comprising each group is shown in the second column, whereas the third column shows the same figures weighted for differences in population of the communities studied. It will be noted that in those communities immunizing less than 5 children per year per 1,000 population the use of ampoules was at a minimum and that as the clinic immunization rate increased there was a progressive increase in private immunization rates. These differences are particularly striking among the communities with the lower rates.

The figures in Table I are as complete as it is possible to obtain. They include, however, several communities, the immunization figures for which are open to considerable doubt, in many cases being in excess of the number of immunizations obtainable from the quantity of toxin-antitoxin in 20 c.c. vials furnished to them. The discrepancies may be due in part to the inclusion of certain children Schick tested and found negative. This inclusion might be fair if all the communities followed this plan, inasmuch as it represents children reached through the immunization program, but the majority do not include the Schick negatives in their reports. Because of the rather

ing which there might be reasonable doubt. This leaves a group of 26 cities and towns with a total of over 1,600,000 population. Table II shows the toxin-antitoxin ampoule distribution in these several communities grouped as in Table I according to the intensity of the immunization programs conducted. It is obvious that in these as in the larger unselected group the demand for immunization in the physician's office, as measured by the distribution of the individual toxin-antitoxin ampoules, varies directly with the extent of clinic immunization under official auspices.

It may be pointed out that in the foregoing figures no account has been taken of inevitable wastage of toxin-antitoxin, and that certain communities may have ordered more ampoules than were actually used. This objection is a valid one as it is well known that certain communities over-order all biological supplies to a far greater extent than do others. In Table III an attempt has been made to correct for this wastage.

The immunizations claimed by the several communities have been compared with the amount of toxin-antitoxin furnished for clinic use in 20 c.c. vials. Although each of these vials contains enough material for 6 2/3 complete immunizations, it has been

TABLE II

AVERAGE DISTRIBUTION OF TOXIN-ANTITOXIN  
AMPOULES—SELECTED COMMUNITIES

Average Clinic Immunization Rate per Year per 1,000 Population	Average Ampoules T-A-T per Year per 1,000 Population	Weighted Average Ampoules T-A-T per Year per 1,000 Population
Less than 5	4.8	4.1
5-10	7.2	4.8
10-15	7.0	6.2
15-20	7.7	7.1
20+	12.4	10.0

obvious discrepancies in the immunization figures of several communities, it has seemed fair to discard those regard-

TABLE III

AVERAGE UTILIZATION OF TOXIN-ANTITOXIN  
AMPOULES—SELECTED COMMUNITIES

Average Clinic Immunization Rate per Year per 1,000 Population	Average Ampoules T-A-T per Year per 1,000 Population	Weighted Average Ampoules T-A-T Used per Year per 1,000 Population
Less than 5	3.2	3.0
5-10	3.9	2.6
10-15	4.2	3.8
15-20	5.5	5.4
20+	7.3	6.6

arbitrarily assumed that in clinic practice only 5½ immunizations per vial can be realized. This allows an ample

margin for the inevitable wastage and has been shown in practice to be reasonable. For example it has been assumed that a community which achieved only 2.75 immunizations per vial supplied has utilized effectively only 50 per cent of the material furnished ( $2.75 \div 5.5 = 0.5$ ). This represents the avoidable wastage due in large part to over-ordering. It is reasonable to assume that a similar wastage has existed with respect to individual ampoules which are used in private practice.

A correction factor measuring the extent of utilization has thus been obtained for each of the selected communities and this factor applied to the number of ampoules supplied to the same community. There has thus been obtained a corrected value for ampoule distribution which probably represents more closely the number of ampoules actually used by the physicians in their private practice. Table III is constructed on the same basis as Tables I and II, except that it utilizes these corrected values. It shows even more strikingly than did the previous tables that the demand for immunization in private practice varies directly with the intensity of the clinic program.

The economic situation in the several communities might logically be thought to be a factor in determining the private immunization rate. Thus it would appear at first glance to be reasonable to suppose that in an economically well-to-do community the demand for immunization in the physician's private office would be greater than in the poorer and strictly industrial city. It might likewise be argued that the better the economic condition of the community the more active a diphtheria immunization program would be conducted and that the private immunization rate was dependent on the former rather than the latter. In Table IV an attempt has been made to evaluate this economic influence. The table shows for the year ending March 31, 1931, the average per capita public welfare expenditures of the communities grouped on the same basis as in Tables I and II. This gives some estimate of the relative economic status of the communities. It is at once apparent from this table that there is no correlation between the relative indigency of the community and the immunization rate. The increase in demand for private immunization demonstrated above cannot, therefore,

TABLE IV

ECONOMIC STATUS OF COMMUNITIES ACCORDING TO CLINIC IMMUNIZATION RATES  
Per Capita Public Welfare Expenditures

Average Clinic Immunization Rate per Year per 1,000 Population	All Communities		Selected Communities	
	Crude Average	Weighted Average	Crude Average	Weighted Average
Less than 5	\$3.63	\$3.74	\$3.56	\$3.60
5-10	3.83	3.94	3.29	3.70
10-15	3.79	3.67	3.77	3.72
15-20	3.75	4.32	3.99	4.50
20+	3.44	3.41	2.90*	2.59*

\* The low figure here is due to an extremely low welfare expenditure in one community which in population exceeded the total of the others in the group. In this city, however, the ampoule distribution and utilization was markedly less than the average for the other communities in the same group. This is not, therefore, inconsistent with the general conclusions that no correlation exists between economic status and immunization rate.

TABLE V

COMPARISON OF IMMUNIZATION RATES AND AMPOULE DISTRIBUTION IN CERTAIN CITIES

	<i>Average Clinic Immuniza- tion Rate per Year per 1,000 Population</i>	<i>Average Amoules T-A-T Supplied per Year per 1,000 Population</i>	<i>Corrected Average Amoules T-A T Used per Year per 1,000 Population</i>
Fall River	16.9	9.8	7.5
New Bedford	3.3	2.5	1.5
Cambridge	15.8	5.0	4.5
Somerville *	0.0	1.5	1.0

\* In 1932 Somerville has carried on an active clinic immunization campaign. It will be interesting to study its effect on orders for ampoules from this city.

be explained on the supposition that a less indigent population has demanded a greater private service.

In the foregoing tables no attempt has been made to compare individual cities, all communities that were acceptable for study being compared by groups. When we compare communities which are similar except for their immunization programs, the differences in ampoule distribution are brought out very strikingly. This is shown in Table V for two pairs of communities.

Fall River and New Bedford are perhaps the most closely comparable cities in Massachusetts. Situated less than 20 miles apart, they have almost identical populations, both as to size and racial makeup and both present similar industrial and economic problems. Cambridge and Somerville are adjacent cities of comparable size in the Metropolitan area. Although perhaps they are not so similar to one another as the former pair, they are so similar that the difference in the figures in Table V are of considerable significance. The great differences in the extent of im-

munizations in private practice as measured by the ampoule distribution is hard to explain on any basis other than that the conduct of the public clinics has created a demand for a similar service in the physicians' offices.

Of considerable interest likewise are the figures for the cities of Attleboro and Brookline (Table VI). These are, to the best of our knowledge, the only two of the group studied in which a systematic house-to-house canvass has been made by public health or visiting nurses to urge immunization upon the parents. That they should have shown the highest level of private immunization of any communities studied seems more than mere chance. It might, of course, be objected that Brookline, which is a wealthy suburb of Boston, is hardly a fair selection. The same criticism can certainly not be levelled at Attleboro, which is a strictly industrial community. The conclusion is inescapable that such a program has created an unusual demand for private service even though free service has been obtainable in public clinics.

TABLE VI

COMPARISON OF CLINIC IMMUNIZATION RATES AND AMPOULE DISTRIBUTION IN CERTAIN COMMUNITIES

	<i>Average Clinic Immuniza- tion Rate per Year per 1,000 Population</i>	<i>Average Amoules T-A-T Supplied per Year per 1,000 Population</i>	<i>Corrected Average Amoules T-A T Used per Year per 1,000 Population</i>
Attleboro	22.8	22.6	9.9
Brookline	10.6	26.1	15.2

TABLE VII

DIPHTHERIA CASE RATES COMPARED WITH RECORDED IMMUNIZATIONS—ALL COMMUNITIES

*Diphtheria Case Rates*

<i>Average Clinic Immuniza- tion Rate per Year per 1,000 Population</i>	<i>Crude Average</i>			<i>Weighted Average</i>		
	<i>1922-1924</i>	<i>1929-1931</i>	<i>Per Cent Decrease</i>	<i>1922-1924</i>	<i>1929-1931</i>	<i>Per Cent Decrease</i>
Less than 5	131	105	19.1	145	117	19.3
5-10	193	104	46.0	210	91	56.7
10-15	228	82	64.0	230	93	59.4
15-20	166	54	67.3	198	64	67.7
20+	165	48	70.9	193	39	79.9
State of Massachusetts	207	78	62.3			

Equally significant with the effect of these immunization programs in stimulating a demand for similar service from the family physicians has been the effect on the diphtheria rates. It has been frequently stated that although there could be no doubt as to the value of immunization clinics in preventing diphtheria, statistical evidence on this point was singularly lacking. Some have also advanced the theory that many of the variations listed in the preceding tables might be due to unusual prevalence of diphtheria in the different communities thus creating a demand for private service. In Table VII we have attempted to throw some light upon these two points. Immunization clinics of considerable size began to appear in Massachusetts about 1923 and have been increasing ever since. The diphtheria rate for the years 1922-1924, inclusive, gives, therefore, a fairly accurate measure of the incidence of the disease before immunization had become so extensively practiced as to produce noticeable effects. It also represents the period immediately preceding that covered by the present study. The diphtheria rate for the years 1929-1931, inclusive, represents the situation at the end of the period studied, by which time the effects of the immunization programs should be discernible.

Table VII shows the diphtheria case rates of all the communities grouped as in Table I (35 communities with 2,000,000 population) according to the extent of the immunization programs and the average diphtheria case rates for the two periods.

In Table VIII similar figures are recorded for the selected group of communities studied in Tables II and III.

It is at once apparent that the differences in case rate for the earlier period were entirely fortuitous and determined by chance. They evidently influenced little if at all the relative vigor with which diphtheria immunization programs were to be conducted. On the other hand, the diphtheria case rate for the second period (7 years later) representing the end of this particular study varies directly and strikingly with the intensity of the immunization program. Those cities which have been relatively inactive in providing for diphtheria control through immunization have experienced but slight reduction in case rate, and still are about 50 per cent in excess of the rate for the state at large. Passing from this group through the intermediate groups to that including the cities conducting the most active programs, there is seen a progressive decline in the diphtheria case rate to a level little more than half that for the

TABLE VIII

DIPHTHERIA CASE RATES COMPARED WITH RECORDED IMMUNIZATIONS—SELECTED COMMUNITIES

Average Clinic Immuniza- tion Rate per Year per 1,000 Population	Diphtheria Case Rates					
	Crude Average			Weighted Average		
	1922-1924	1929-1931	Per Cent Decrease	1922-1924	1929-1931	Per Cent Decrease
Less than 5	133	108	18.8	156	128	17.9
5-10	211	103	51.2	222	94	57.8
10-15	200	78	61.0	197	91	53.9
15-20	187	62	66.8	205	68	66.8
20+	184	46	75.0	187	47	74.8
State of Massachusetts	207	78	62.3			

state. It is hard to draw any conclusion from these figures other than that the diphtheria case rate of the various communities in Massachusetts is directly influenced by the immunization work that has been conducted in clinic and private offices.

## COMMENT

In interpreting the foregoing tables it should not be assumed that any one figure has inherent value. At best all of the figures must be mere approximations. Errors may have entered into the recording of children in public clinics. The figures as to private immunization as determined by ampoule distribution are far from precise inasmuch as it is impossible to measure the exact extent to which these ampoules have been utilized. On the other hand, the errors which make these figures little more than approximations are probably fairly constant from one community to another. Inasmuch as the communities are grouped in the various tables the differences in error will to a large degree correct each other. It would certainly be most unreasonable to assume that the errors were all in one direction in communities that had been backward in immunization and in the opposite direction in those that had been active.

Remembering then, that the figures are at best but relative, it is of con-

siderable significance that the trend is so consistent and regular in the various groupings. Table I, which includes all communities over 20,000 (with 3 exceptions noted above) contains the records of several cities and towns which might be challenged. They are included in this tabulation simply to avoid any appearance of so selecting the communities to be studied as to influence the results artificially. It is rather striking that even with the inclusion of these doubtful figures, the trend is so regular and so great.

In the other tables a careful and impartial selection has been made. Only 9 cities and towns have been excluded. The group for study remains so large that the trend which is now even more striking is of unquestionable significance. The same trend is apparent in all the tables. It is the direction and constancy of this trend that is of significance rather than its exact magnitude. The latter will depend on many individual factors and can never be regular for all communities. To the best of our knowledge there is no factor which may have determined this trend other than the different community immunization rates which have formed the basis for the groupings. There appears to be only one explanation for these trends, viz., that the active conduct of a diphtheria immunization clinic program stimulates a demand for such immuni-

zation within the office of the private physician.

It might be supposed that the vast amount of publicity that has been given recently to diphtheria immunization through the newspapers, radio, insurance companies, and magazines for parents would have created such a demand irrespective of a local program. Unquestionably, this has occurred to a slight extent, for during the seven years under study there was a definite though slight increase in demand for private immunization in those communities that have been completely inactive. It is impossible to determine the relative importance of the various factors, or even the extent to which this increase may have been due to an increasing recommendation for immunization by physicians among their patients. These various factors would, however, be constant for all communities, irrespective of the extent of the clinic immunization program. It must be assumed, therefore, that the differences in extent of private office immunization are due to the stimulus attendant upon the conduct of the clinic, and that the stimulus creates a demand on the part of the public for such service in the physician's private office.

Of equal importance with the above considerations are the figures showing

the effect of the clinic programs in reducing the diphtheria rate. It is hard to draw conclusions as to the effect of diphtheria immunization by comparison of individual communities. The age distribution of the children immunized, their uneven distribution over the city in question, and many other factors make such comparisons treacherous and uncertain. On the other hand, when a large number of communities, as above, are studied and the average diphtheria and immunization rates are compared, it is evident that diphtheria decreases as immunizations increase.

#### CONCLUSIONS

1. The active conduct of diphtheria immunization clinics under official auspices creates a demand for immunization in the office of the private physician.

2. The extent of this demand for private immunization varies directly with the intensity of the clinic program.

3. Without an actively conducted program for diphtheria immunization, the public demand for this service is negligible.

4. Within reasonable limits the incidence of diphtheria in a community varies inversely with the intensity of its diphtheria immunization program.

## Children's Code in Costa Rica

THE Children's Code of Costa Rica, enacted late in 1932 by the Congress of that country, announces in its opening paragraph that protection of the mother and child is the function of the State. Practically all the provisions of the code are new in the legislation of Costa Rica. A series of measures on maternal welfare is enumerated in the chapter devoted to that subject; among the measures are provisions for the introduction of ma-

ternity insurance, the establishment of prenatal centers, and the provision of home care and institutional care for maternity cases. The employment of women in industrial and commercial establishments, public or private, is prohibited by this code for four weeks before and four weeks after childbirth. Women in Government service are given leave with full pay during that time; those in private employment are paid one-half of their wages.



# The Tuberculosis Movement Today\*

DONALD B. ARMSTRONG, M.D., Sc.D., F.A.P.H.A.

*Third Vice-President, Metropolitan Life Insurance Company,  
New York, N. Y.*

A BRIEF title to any paper is always an advantage. At the same time it may be misleading. Certainly we are not attempting here a comprehensive or exhaustive analysis of the tuberculosis movement today. Rather, we shall endeavor to point out a few of the more conspicuous features of this program, a few of the principal points of emphasis, with their indications as to how effort may be most promisingly applied in the immediate future. Certain comparisons between the situation today and that of a decade or two ago may also be of significance.

A glance at the tuberculosis program of 15 or 20 years ago, in the light of our interests and objectives today, brings out certain contrasts and certain similarities. In the first place, it is evident that some of the attitudes and slogans of the early period still hold good, though occasionally with a difference in interpretation.

Sixteen or 17 years ago, when the Framingham Tuberculosis Demonstration was initiated, certain experience in connection therewith crystallized in the statement, "The next step in tuberculosis work is the first step, namely, find the cases." To a large extent that is still true today, as evidenced by our Early Diagnosis Campaigns and similar projects. There is, however, some difference in approach. Then, we were mainly in pursuit of the adult, and of the active case, in order to get him into

the hands of the physician, to provide a clinical examination, to arrive at a diagnosis and to secure proper treatment. We are now much more interested in and hopeful about tuberculous infection. We are also much more interested in childhood. The basis of our attack has broadened. We are endeavoring to break the tuberculosis chain further back in the chronology of the typical case of disease. We are interested not only in the active case, especially in young adults, and more particularly in females, where the rates are relatively high, but in infection, and in the so-called latent case in childhood, with the earliest signs of invasion.

We have become aware that roughly speaking there are 3 and sometimes 4 principal periods or episodes in the typical case of tuberculosis: infection, latent childhood disease, perhaps reinfection, and active adult disease.

This change in point of view comes about through our acquisition of greater knowledge of the epidemiology of the disease. The science of epidemiology is at last being effectively applied to the problem of tuberculosis. Our point of view concerning the incidence of tuberculous infection has more or less radically changed. There may have been a time in urban populations when tuberculous infection was practically universal, but this can no longer be assumed. It is true that in certain rather selected urban groups its incidence is still high. Hetherington still finds 90 per cent of adolescent school

\* Read before the Annual Meeting of the Indiana Tuberculosis Association in Indianapolis, Ind., April, 1933.

children or pre-adults with positive tuberculin tests in Philadelphia. It is believed, however, that a more representative finding is that reported from Massachusetts where the average for many communities among children between 5 and 15 years of age is 28 per cent. Incidentally, when these are examined by X-ray, 5 per cent show some damage, usually slight, and in about 1 per cent this is serious enough to require continued medical attention. Instances of the opposite extreme in positive tuberculin findings are reported by Broker, in Minnesota, where only 1 in 160 girls and boys was positive, and by McCain, in North Carolina, where only 4 per cent were positive. It may be remembered that in 1917 in Framingham a group of younger-aged school children showed 33 per cent with positive tuberculin reactions. Ten or 12 years later, after the Demonstration, a considerably older school age group showed only 18 per cent positive. These two sets of tests were sufficiently similar in technic to be legitimately compared, even though differences in method may in part account for some of the wider variations among recent findings cited. It would therefore appear that the prevalence of tuberculous infection is diminishing and that it is controllable. It is no longer necessary to assume that infection is inevitable. It is possible to find the foci of infection, whether human or animal. It is worthwhile, therefore, to stress the point that every tuberculosis case comes from another. The search for family foci in particular is profitable. The examination of contacts is advantageous both from the angle of discovering a source of infection and also from that of disclosing possible channels for further dissemination.

All of this represents a rather striking change in point of view—a new attitude that is perhaps the principal feature of the tuberculosis movement

today. The discovery of the child in tuberculosis promises to be a very great contribution, not only to the welfare of children but also to the problem of tuberculosis control at large. This approach has stressed the intensive use of relatively new instruments in the wholesale search for the disease. Fluoroscopy as a screening process, and the use of the tuberculin test with the X-ray have very advantageously supplemented the older clinical procedures. The use of these diagnostic devices tends to become universal among the younger age groups, only the question of cost standing in the way. Here the situation is promising. Experiments are indicating the feasibility of these procedures on a large scale. For instance, the Queensboro Tuberculosis Association in New York, with the coöperation and financial aid of the Metropolitan Life Insurance Company, has been experimenting with the Powers portable rapid X-ray camera and paper films, demonstrating the possibility of making as many as 1,000 chest exposures in a day, at a per capita cost somewhere in the neighborhood of \$.75, including the expense of interpretation. Experiments elsewhere indicate a cost possibly as low as \$.40. In normal times many communities would not find this too great a burden to add to the routine school health and medical examination procedures.

It is true that there is as yet no universal acceptance of the significance of so-called latent tuberculosis in childhood, as to its hygienic or therapeutic indications in all cases; yet on the whole the outlining and defining of this phase of the manifestation of tuberculosis seem to represent a big advance in our concept of the disease and in our methods of detection and control.

In the meantime, while human foci have been more and more frequently detected and eliminated, much progress has also been made toward the elimina-

tion of animal foci and the control of the hazards of tuberculous milk. It is well to realize the progress made in these directions and the necessity for maintaining the position now held. A relaxation in our efforts at control may be costly. One cannot but experience misgivings when one notes serious curtailments, for instance, in appropriations for health department epidemiological activities, or for institutional care of open cases of the disease. It is not reassuring to read of the organized opposition to the tuberculin testing of cattle in Iowa and elsewhere. We are here faced with the dangers of losing the advantages gained in the past, and of restoring certain of the largely eliminated hazards of childhood. There might also readily be incurred serious economic consequences to individuals and families, to the cattle and dairy industries, and to our communities generally.

Still in the general field of epidemiology, it is regrettable to note that while great steps in advance have been taken along the above mentioned lines, little progress has been made toward the artificial immunization of humans against this disease. The Calmette vaccine is, of course, being widely experimented with. Certain observations reported by foreign experimenters seem promising but are accepted with reservations here. European statistics concerning the effectiveness of the vaccine are viewed with doubt by statistical authorities in this country. Perhaps the most basic work in the field is being done by Park in New York, with the coöperation of the Metropolitan Life Insurance Company and other agencies. Here the vaccine is being used with careful controls, and with results that are considered encouraging. However, most authorities feel very definitely that this procedure occupies a controversial position and cannot as yet be endorsed for routine or wholesale application.

On the other hand, more strictly in the field of treatment, but of public health as well as therapeutic significance, it is very encouraging to note the increasing success with which the lung collapse, rib resection, and other forms of thoracoplasty are being employed—procedures that with increasing frequency are proving advantageous to the patient, as well as helpful in decreasing human foci of infection. These certainly represent outstanding advances in treatment methods of the present and recent past, and may be of sufficient significance to account in part for the continued improvement in tuberculosis mortality.

This suggestion seems to be borne out by available records. As is well known, in the treatment of advanced cases with extensive cavitation prior to the days of thoracic surgery, the early mortality following diagnosis was extremely discouraging. In a study by Sprungmann, based on 626 cases, there was found a total mortality of 78.2 per cent in 16 years, and a death rate of 61.7 per cent in the first 2 years. Barnes and Barnes, in 1,450 cases, found a mortality of 80 per cent within 1 year, and 90 per cent within 5 years. In contrast to this, as Fischel recently pointed out, a study by Neuberger based on cases treated with thoracic surgery indicates that after 1 to 5 years, over 61 per cent had regained and retained their working and earning capacity, and only 17 per cent had died, the remaining being in the incapacitated group. Chadwick, from the experience of the Herman Kiefer Hospital in Detroit, referring to the period 1929 to 1932, states that "The number discharged with favorable results has increased from 45 per cent to 69.8 per cent, and the number of deaths has decreased from 25 per cent to 6.5 per cent. The marked reduction of deaths and the improvement in discharged patients have been due in a large

measure to the general use of collapse therapy." When one realizes the increasing extent to which this great contribution to tuberculosis therapy is being applied by institutions throughout the land, the above assumption concerning its probable relationship to mortality seems justified.

On the statistical side we are all aware of the progress that has been made as measured by the death rate from tuberculosis. With the disease now ranking 7th or 8th, we have come a long distance since the time when it occupied the first position as cause of death. However, it must be recognized that mortality is by no means a complete measure of the situation. Furthermore, deaths at all ages are sometimes not as significant as deaths in particular age groups, as has been frequently pointed out. This is especially true of tuberculosis, which still stands first as the cause of mortality and disability in the productive period of life from 20 to 40 years. Nevertheless, the mortality rate presents a gratifying picture. Among Metropolitan industrial policy holders, who constitute a group of many millions, the death rate for 1932 reached 70.1 per 100,000, contrasted with 114.2 in 1922, and 224.6 in 1911. This improvement in 1932 seems to have been characteristic for the country at large, so far as records are available. Here in Indiana, with the rate of 88.1 in 1922, and 61.1 in 1931, the rate was 59.9 in 1932, which represents 16 fewer deaths than in 1931. In the Metropolitan experience the drop in 1932 is 8.6 per cent under the previous year, which is the biggest percentage annual decline in a decade. Thus far, 1933 seems to be reflecting this downward trend, the cumulative rate to date being 66 as compared with 69.2 in 1932. There seems to be no reason as yet to doubt Dublin's earlier forecast of a rate of 40 for Metropolitan industrial policy

holders by 1939, and a rate that may fall between 28 and 37 per 100,000 for the original registration states by that year.

On all hands considerable surprise has been expressed that there has been thus far no effect upon the death rate coincident with the depression. While this is evidently a fact, of course no one can yet estimate the ultimate effects of the depression, and no one can say what may or may not follow the underfeeding and malnutrition and other physical and mental characteristics of the depression period, especially as they bear upon childhood. Certainly undernutrition is by no means negligible, as shown by the fact that in New York City alone, in 1932, 32 deaths were reported by the Division of Medical Records as resulting from starvation, including no cases of refusal to eat, inability to eat, or cases of deficiency disease. The prospects are considered by many to be disturbing, yet thus far, in addition to the mortality picture, there have been reported no very significant or definite signs of an increase in the incidence of latent or active tuberculosis in any age group.

Indeed, 1932 was the best year thus far in the general mortality experience of Metropolitan industrial policy holders, and probably also of the population at large. It seems probable that a combination of circumstances may be responsible for this favorable situation. In the first place, health departments and voluntary health agencies have operated effectively, even with curtailed resources. In the second place, relief, even though on a minimum basis in many communities, has nevertheless been organized and administered with thoroughness. In the third place, our public at large was fairly well informed concerning disease prevention and health conservation, and has drawn upon the reserve of education built up

in the pre-depression years, contributed to by public and private agencies alike. Finally, and perhaps most important, climatic and epidemic conditions were most favorable during 1932. In particular, we were relatively free from outbreaks of acute respiratory disease, particularly influenza. When influenza and pneumonia incidence and mortality are low, deaths from other causes, including tuberculosis, tend to remain at a minimum. By way of contrast, we have the experience of 1918, and indeed the minor influenza outbreak in the early part of 1933, when deaths from many causes showed a tendency to increase, although, fortunately, this set of circumstances in this latter instance has appeared not to have affected the tuberculosis mortality to a serious degree.

Looking back over the remarkable decline in tuberculosis mortality in the last several decades, it must of course be admitted that many forces and factors have been at work, including economic and social improvement, general sanitation, occupational hygiene, etc. Nevertheless it has been definitely established that the antituberculosis campaign in which we have all been engaged has contributed materially to this very concrete accomplishment. There is every reason to hope that the campaign, if continued along present lines, with such modifications in emphasis as new knowledge and circumstances may dictate, will lead us—providing we meet with no serious setback such as might be associated with the sequelae of the depression—to man's ultimate conquest of tuberculosis that will place this disease, alongside of typhoid fever, yellow fever, and diphtheria, in the

museum of fast disappearing causes of death.

Hopeful signs that augur well for the future are the coöperation of forces and the integration of effort that seem to be more and more characteristic of our general health program. There is, I believe, a greater mutual understanding of aims, and mutual aid between health and medical organizations than ever before. This applies to tuberculosis associations, to physicians, to health officers, and to civic and industrial units. The leadership of health authorities is becoming more conscious, more liberal and more constructive. Our present joint efforts to maintain appropriations and personnel for public health work are an encouraging sign of the times. In addition, as stated above, the public is better informed than ever before, as a result of the activity of such organizations as the Indiana Tuberculosis Association.

All this leads us to hope that in spite of the present serious handicaps, we may be successful in holding the gains of the past, in experiencing only a temporary curtailment in our resources, and in making a wisely balanced use of such facilities as we now have for the promotion of the most essential services. We can also hope to see the most effective integration of the tuberculosis movement into the general health program, recognizing its relation to administration, to sanitation, to education regarding nutrition, health examinations, and similar health promotive activities in the field of personal hygiene. The realization of those hopes, in which I know you all share, will carry forward the control of tuberculosis to a triumphant termination.

# Smoke Abatement at Low Cost\*

MORRIS M. COHN, M.Sc. IN C.E.

*Sanitary Engineer, City of Schenectady, N. Y.*

HEALTH activities are no more immune from amputation than are the municipal markets or the ornate fleets of limousines. Old services fight to endure. New services are whispered about behind closed doors and then pigeonholed to await a more auspicious day of birth. It is in such a world of indefinite values that the infant, Smoke Abatement, finds itself.

The whole problem of air hygiene is comparatively new in civic progress. The cities that have pioneered in smoke abatement have merely scratched the surface of the difficult task. In many cases, smoke abatement laws were enacted during the days of municipal munificence, and even then enforcement of the new regulations was made impossible because of lack of organization. In the present financial stress, a new service like smoke abatement is likely to fare poorly. Many cities now engaged in atmospheric cleansing will find themselves with the vehicle of air hygiene and no motive power, while for those proposing the inauguration of smoke abatement campaigns, there is discouragement ahead.

Even the most ardent proponent of smoke abatement will admit that the most rigid anti-smoke ordinance, the most intelligent boiler installation control, and the most vigilant smoke detection cannot produce an unhazed skyline. What is first needed is a smoke-conscious citizenry. To whom does

smoke abatement appeal? The general public? They can get little satisfaction from the statistical fact that their city's smoke costs each citizen \$15 a year, when they know that every dollar they have had in the past year has gone for food and clothing—the bare necessities of life. The merchant? The argument that smoke ruins his merchandise falls upon deaf ears when he realizes that business is poor and the most frequented spot in his shop is the bargain counter of soiled goods. The property owner? While the smoke official recounts the sooting effects of smoke and the destructive action of stack fumes, he is mentally computing his tax bill and wondering where he can raise the money to pay it. The ultra-violet ray addict? He is too busy basking in the radiance of his sunshine lamp and eating irradiated foods to worry about the sun-robbing effects of smoke.

Who else? The building superintendent? While he listens to the scientist explain that smoke means poor combustion and money wasted, he is deciding to buy a cheaper grade of fuel and use the porter for fire stoking, thus enabling him to discharge the expensive fireman. The civic leader? Talk to him about the dangers of the smoking factory stack and he raises his hands heavenward and fervently prays for more smoking industries.

This is rather a pessimistic picture for a smoke abatement proponent to paint. Fortunately, the pitfalls have been exaggerated for the sake of emphasis.

Smoke abatement efforts must not

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

cease, even in the face of depleted budgets. There are certain services which must be provided whether the public wills it or not. Smoke abatement is one, though it is less recognized as a health policy than are the others which control environmental conditions. A let-down in this work may destroy much of the progress made by the pioneers. It is the duty of existing agencies to keep going, somehow, some way, until financial conditions permit other cities to take up the work. Now is the time for all sanitarians to talk price; bargains in smoke abatement will become mighty popular.

#### SCHENECTADY PLAN

It is interesting to review the smoke abatement policy of Schenectady, N. Y. The control methods and accomplishments of that community's campaign are worthy of attention, not as examples of what a good smoke abatement program should be but what it has to be to meet present financial conditions.

Schenectady, a manufacturing city of 97,000, has regulated its growth in accordance with a zoning code since 1927. In setting forth the areas available for certain types of commercial and industrial activity, the zoning law designated 3 zones of unrestricted manufacture, these being in the areas occupied by the General Electric Company and the American Locomotive Company, the two leading industries.

The original smoke ordinance went into effect in 1927. It contained all of the approved provisions. Smoke of greater density than No. 3 on the Ringelmann chart was not permitted for more than 75 seconds of any one hour, except when fires were being started or cleaned. A 6-minute smoke production was permitted per hour under such conditions. The 3 zones of unrestricted manufacture were designated as zones of unrestricted smoke, no control being maintained over the

industries. Smoke was restricted from all structures, tugs, locomotives, rollers, etc., but smoke from any residence was not a violation of the law. The Bureau of Engineering was designated as the enforcing agency. Smoke production became a misdemeanor subject to fines of from \$10 to \$100, each day of smoke production being a separate violation. Permits were required for the installation of new boiler equipment or major repairs to existing units.

For a period of a year and a half, Schenectady found itself with a cumbersome ordinance, difficult to enforce in its entirety, and without a staff to serve as the enforcing agency. One man, a heating engineer, was charged with the task of reviewing plans for boiler installations, inspecting installations for conformity with the plans, issuing permits, and observing smoke violations. In his spare time he designed the heating and ventilation systems for a rather extensive group of city buildings then under construction. Even sweet Charity could class this type of smoke abatement as nothing more than a low-class activity at low cost.

In 1928, a simplified abatement ordinance was adopted, the old one being retired from the books. It made no provision for control over boiler installations or repairs. Smoke from residences was brought under control and all other smoke provisions of the old ordinance were retained.

It is characteristic of the general bargain-hunting spirit that the enforcement of the new ordinance was again delegated to one man, the writer, who served as engineer of sewage treatment and director of the city's material testing laboratory, and utility man on general municipal sanitation problems. Located at the treatment works—and all sanitarians know where that is in relation to the business district—the smoke abatement official was in a

poor position to act as a smoke spotter. The work consisted of investigation of specific smoke complaints, observation of points of potential smoke production as time permitted, and a slow methodical all-city survey of stacks that was planned to take 6 months. A program of friendly contacts with smoke violators was inaugurated although little time was available for the study of troublesome installations for the purpose of improving combustion.

In this campaign of hit-or-miss smoke control, some improvement was noted. What benefits were reaped, however, were neutralized by the general dissatisfaction produced by the sporadic activities. The one-man campaign was filled with embarrassments for the municipality. A call upon the owner of a smoking stack was certain to end in a denunciation of a policy that attacked his humble building and left dozens of others to go scot-free. Each violator could enumerate an imposing group of other violators; it was impossible to obtain coöperation under such conditions. Furthermore, persistent complaints from some neighborhoods could not be verified by the inspector in the short periods he could devote to the nerve-racking job of watchful waiting. It became whispered about among a group of disgruntled housewives that the inspector was in league with the owner of a troublesome laundry and that no smoke would ever appear until the official took his leave. This group took pictures of the smoke from this stack and presented the evidence to the writer with ill-concealed sarcasm.

Here is a lesson for any community that proposes to set up a one-man organization to control smoke, unless that man becomes a mere spotter located in a crow's-nest with field glasses trained upon the sky-line. No active campaign can be waged until the smoke abatement organization comes out into the

open to wage battle and offer assistance to property owners. It can be established as an axiom of smoke abatement that "the more visible the staff, the more invisible the smoke."

It became evident in Schenectady that smoke abatement would die a well-wished death unless violators were assured that stack control was universal rather than individual. This required an increased staff. Even in the more generous days of 1930, no funds for this purpose were forthcoming. It was found, however, that the Fire Prevention Division of the Fire Department was doing work akin to smoke abatement. The inspectors of this division were checking up on oil burners and were often instrumental in obtaining stack extensions made in the interests of safety.

An appeal to the Commissioner of Public Safety met with willingness that the Fire Prevention inspectors should assist in the smoke abatement program in the capacity of smoke inspectors. At one stroke, a non-technical inspection force became available at no cost to the city. This group, while unversed in smoke abatement procedure, was especially well trained in city inspection work. The unit consisted of a fire marshal, an assistant fire marshal, a chief inspector and 6 inspectors. These men had been chosen from the Fire Department when the division was formed. The city had been divided into 6 districts ranging in size from small areas in the congested business section to larger areas in the outlying sections. One inspector was put in charge of each district, the business and secondary business territories being covered by the inspector daily and the residential sections every 2 to 4 days, depending on the locations. Each inspector knew his territory "like a book," and knew likewise the owners of the principal business and commercial establishments like the characters in that book.



Here was an inspection force that with proper training could be made into a splendid smoke detection staff. A course of instruction was arranged. At a series of informal chats, the firemen were informed about the dangers of smoke, the abatement activities of other cities, and what could be expected in their own city. A non-technical explanation of the theory of combustion was also presented. A special effort was made to show the relation between the improper combustion conditions that produce smoke and fire hazards. The men were taught to gauge smoke densities by means of the Ringelmann chart and every opportunity was taken to point out smoke from the windows of the lecture room and have the men guess its color density. A splendid picture of a No. 3 smoke was duplicated and a copy mounted in a pocket folder presented to each inspector for use during the training period.

The men were sent out for a probationary period of smoke observation, during which they made notations of all smoke observed, regardless of density or period of duration. The men entered upon the work with vim and derived great pleasure from their new accomplishments. Within a short time the firemen were sufficiently acquainted with their tasks to warrant placing them on the streets as official smoke inspectors. For almost 2 years, these men have vigilantly observed all smoke violations in the city. They have done their work well; it is a mighty infrequent smoke plume that gets by the inspectors.

All smoke violations are recorded on small report forms of file-card size which are turned in to the fire marshal each day. The firemen are instructed to call the attention of each violator, as quickly as possible after the smoke is observed, and to urge remedial measures. No technical advice is offered. If the property owner asks for advice, the case

is referred to the engineer who calls upon the owner and makes suggestions for improved combustion. Where possible, the firemen or the chief inspector is in attendance at this time and he attempts to check up, during subsequent inspections, to determine if the advice is being followed.

Weekly conferences are held during the heating season, at which the engineer and the inspectors discuss the findings of the previous week. If any inspector has experienced trouble with a violator, the case is discussed. It is interesting to note that other inspectors usually know the individual and something of his property and can offer suggestions on how the person can best be handled. Letters are frequently addressed to such violators, suggesting in a friendly vein that steps be taken immediately to correct the smoke violation. A copy of the smoke law is attached. Similar letters are sent to those violators not visited by the inspectors.

Several innovations have been introduced in Schenectady for the purpose of making possible the low cost control. The city has made an appeal to all coal dealers handling bituminous coal to supply their customers with the lowest volatile fuel consistent with their price limitations and combustion conditions. Several installations have changed from bituminous to small-size anthracite coal as a result of this activity. Others have changed to non-smoking types of bituminous fuel, and smoke conditions have improved as if by magic.

A coöperative campaign was waged by the city and the fuel economy officials of the two railroads that serve the community. One line went to the expense of posting notices of Schenectady smoke regulations at their division points and having their locomotive inspectors obtain the signature of each engineer and fireman to a statement that they had seen the notices.

Several careless firemen and their engineers were called before the superintendent and reprimanded. As a result, the locomotive that stands at the station and paints the city with a bituminous brush is the exception.

No control is maintained over the installation of new or the repair of old fuel burning equipment. The Schenectady policy has been, "If the stack is right the boiler must be right." Discontinuing this control with the enactment of the new smoke ordinance has made enforcement much simpler. At the same time, it has removed but little of that valuable regulation which the city previously had over the equipment that was to make smoke in the future. In the case of Schenectady, little new boiler work was being carried out and that being done was a small portion of the total fuel burning equipment in the city. Since no control was possible over existing equipment, the loss of control over new units was not a serious matter. More important, however, is the fact that the city has maintained an invisible control over new boiler work, without actually seeming to do so. It has become customary for property owners, architects, and contractors to require the boiler manufacturers to

guarantee that their equipment would comply with the existing smoke law. Requests for copies of our ordinance are often received from manufacturers.

The Schenectady plan is full of corner-cutting schemes, which, I fear, will not endear it to the hearts of those who take air hygiene as a scientific problem for scientists. The inspectors are not technically trained to solve combustion problems. Their findings cannot, therefore, be used to force compliance with the law by strong arm methods. The Schenectady program is planned, of necessity, to be politely persistent rather than belligerently bossy.

The low cost smoke abatement plan is not an aggressive, speedy method of giving a community its place in the sun. It can, however, provide the means of keeping an existing program from complete extinction and may even enable new cities to inaugurate atmosphere sanitation in the face of economic odds. The Schenectady plan makes use of a fire prevention inspection staff. Other cities may make use of some other official or non-official group. The keynote of successful smoke abatement is coöperative effort. It is on the foundation of concerted effort that low-cost smoke abatement can be built.

---

## German Health Center for Mental Disorders

A HEALTH center for mental and nervous disorders, excluding feeble-mindedness, is functioning in a suburb of Berlin. The work of the center is concerned with both adults and children. Some children are brought voluntarily by their parents, but the great majority come from the public schools, the Children's Bureau of Berlin, the child health centers, and other welfare agencies. At the child health centers, all children above the

age of 3 are examined as regards language, habits of cleanliness, and behavior while at play, and those deviating from normal are referred to the center for mental and nervous disorders, where the necessary treatment is provided. In this way it is hoped to introduce a general system of psychological testing of young children in order to detect early any deviations from normal. — *Gesundheitsfürsorge für das Kindesalter*, Berlin, 7, 6, 1932.

# Bacterial Content of Frosted Hamburg Steak\*

LAURENCE P. GEER

*Massachusetts Institute of Technology, Cambridge, Mass.*

WILLIAM T. MURRAY AND ERNEST SMITH

*Birdseye Laboratories, Gloucester, Mass.*

THE increasing popularity of foods preserved by the quick freezing process is causing attention to be focused upon the numbers of bacteria which may be expected in such foods. How does the total count compare with the total count of food of the same kind and grade unfrozen? Will the freezing process and subsequent cold storage kill an appreciable number of the bacteria originally present?

In the case of fish products, Birdseye<sup>1</sup> has shown a marked reduction in total numbers during the process of preparing, freezing, and storage. Berry<sup>2</sup> has shown a reduction of 90 to 99 per cent in berries after freezing and storage, for 1 year at 15° F.

This paper is concerned with hamburger steak, since this product is subjected to considerable manipulation, and is known to yield a high count of bacteria.

Several investigators studied the plate count of hamburger steak as an index of its sanitary quality. Marxer<sup>3</sup> suggested that a sanitary limit of 1,000,000 bacteria per gm. be set, but in 1914 Weinzirl and Newton<sup>4</sup> found this standard too low and suggested 10,000,000 as fairer. In 1917 Lefevre<sup>5</sup>

made counts on 22 samples of hamburger steak in Washington, D. C., and his results checked closely with those of Weinzirl and Newton, but he concluded that 1,000,000 bacteria per gm. was not an unreasonable limit.

The present investigation includes counts upon 10 samples of fresh, unfrozen hamburger steak as bought in the markets, and 10 samples of Birdseye Frosted Hamburg Steak, bought from retail stores. The frosted hamburger steak was purchased in 1 lb. Peters type cartons in which it was offered for sale. The cartons were not opened until they reached the laboratory, but in each case the contents were still solidly frozen when opened.

The unfrozen hamburger steak was bought in clean, first class meat markets. In the case of 7 of the samples the meat was removed by the market attendant from an already ground batch on display in a refrigerated case. The other 3 samples were ground at the time of purchase. The purchaser of the meat in each instance insisted upon "highest quality."

The purchases were all taken to the laboratory as quickly as possible and sampled within 1½ hours. For each specimen of hamburger steak, 3 check samples were taken from different portions of the mass. Six plates were

\* Read before the Food and Nutrition Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 22, 1932.

counted for each of the 3 check samples, and the average was taken as the count for that particular sample. The average of the counts of the 3 samples was then taken as the count for the batch of hamburger purchased, making an average of 18 plate counts for each figure given in the tables which follow.

In the literature reviewed no reference to a standard method was found, and little was said of the method followed. It is evident that in work dealing with materials of the class here reported on, the technic of preparing the sample is of utmost importance. The more thoroughly the tissue is disintegrated, and the clumps of bacteria broken up, the nearer the plate count will approach the actual number of living organisms present. This will mean, with the present technic, a somewhat higher count than some of those recorded by earlier observers. The procedure adopted in the present investigation was originally described by Dr. P. K. Bates, director of the bacteriological laboratory of the Frigidaire Corporation, and modified by the authors in conjunction with H. C. Needle of the Massachusetts Institute of Technology. It is as follows:

Ten c.c. of a rather coarse white sand (20-40 mesh), and 90 c.c. of distilled water are placed in a 300 c.c. Ehrlenmeyer flask, which is then plugged and sterilized, and, before using is cooled to 35° F. The plug is removed, the neck flamed, and the flask weighed. Approximately 10 gm. of the sample are placed in the flask, which is then reweighed. All weighings are made to the nearest 0.1 gm., and the calculations are made upon the basis of the actual weight of the sample. The hamburger steak should be thoroughly mixed with a sterile spoon, and the samples added to the flask with sterile forceps, picking pieces from various portions to obtain a representative sample. The flask is

then tightly closed with a sterile rubber stopper and placed in a refrigerator at 35° F. for 1 hour. Experimental evidence has shown that bacteria will not increase materially at that temperature during this period, and the water works its way into the interstices of the meat, weakening its structure and allowing better maceration upon shaking. The flask is then placed in the shaking apparatus, which has a stroke of 6 inches (1 foot per revolution) and makes 180 revolutions per minute. The flask is shaken for 5 minutes, after which it is removed and allowed to stand for 5 minutes. During this time the sand and larger particles separate out, but most of the bacteria remain in suspension, and the solution can be pipetted readily.

The solution in the flask is now considered 1:10 dilution: that is, the number of bacteria per c.c. is 0.1 of the number per gm. in the hamburger steak. Dilutions 1:1,000, 1:10,000, 1:100,000, and 1:1,000,000 were made as a routine, and plated upon Difco nutrient agar. All plates were incubated at 25° C. for 72 hours.

The results of the examinations are shown in Tables I and II, and show a definitely smaller number of bacteria in the frosted hamburger steak than in the fresh. No sample of the frosted hamburger steak showed a count as high as the lowest of the fresh, and the average count of the frosted is 89 per cent less than the average of the fresh.

The above facts led to a consideration of why the frosted meat contained relatively so few bacteria. Ten packages of the unfrozen hamburger steak were obtained from the establishment which had packed the frozen samples used in the first experiment. From each of the 10, 3 samples were taken according to the method described, the packages were then frozen in a Birdseye multiple plate froster, according to regular commercial procedure, and 3

TABLE I

TEN SAMPLES OF UNFROZEN HAMBURG STEAK

Market	Bacteria per Gram
No. 1	24,300,000 *
2	43,700,000
3	6,000,000
4	6,700,000
5	18,300,000
6	16,200,000
7	8,500,000 *
8	10,100,000 *
9	27,100,000
10	20,100,000
Average of 10 samples	18,100,000

\* Freshly ground at time of purchase.

samples again taken from each package. A third series of 3 samples was taken after 1 month's storage at 0° F. The results are given in Table III.

The quick freezing process causes a material reduction in the numbers of bacteria and, in general, the greatest reduction comes in those samples having the highest initial count. The per cent reduction varies from 66.6 to 87.9 per cent, the average being 79.5 per cent. A subsequent period of storage of 1 month at a temperature of 0° F.

TABLE II

TEN SAMPLES OF FROSTED HAMBURG STEAK

Dealer	Bacteria per Gram
No. 1	1,100,000
2	2,600,000
3	2,400,000
4	1,500,000
5	2,400,000
6	3,200,000
7	2,100,000
8	2,300,000
9	1,900,000
10	700,000
Average of 10 samples	2,000,000

still further reduces the numbers of viable bacteria, the average reduction under these conditions being 24.5 per cent. The over-all average reduction due to freezing plus storage for 1 month is 84.1 per cent.

A sanitary standard considerably below 10,000,000 per gm. seems warranted for this type of product, and bacteria counts of properly frosted and stored hamburger steak may be expected to be consistently lower than those of the best grade of the fresh product for sale in high class meat markets.

TABLE III

BACTERIAL COUNT BEFORE AND AFTER FREEZING, AND AFTER ONE MONTH'S STORAGE AT 0° F.

Sample No.	Bacteria per gm. Before Freezing	Bacteria per gm. After Freezing	Per Cent Reduction During Freezing	Bacteria per gm. After Storage	Per Cent Reduction During Storage	Total Per Cent Reduction During Freezing and Storage
1	11,400,000	2,600,000	77.2	1,300,000	50.0	88.5
2	22,300,000	2,800,000	87.9	1,200,000	57.1	94.5
3	14,400,000	2,100,000	85.4	1,600,000	23.8	83.9
4	9,800,000	2,300,000	76.5	1,100,000	52.1	87.8
5	12,400,000	2,000,000	83.9	1,200,000	40.0	90.3
6	3,600,000	1,200,000	66.6	1,300,000	08.3*	63.9
7	11,400,000	2,100,000	81.7	1,900,000	09.5	83.3
8	9,600,000	1,900,000	80.3	1,500,000	21.1	84.3
9	15,400,000	4,000,000	74.1	2,100,000	44.5	86.3
10	5,900,000	1,100,000	81.4	1,600,000	45.4*	73.1

\* Increase

Average bacteria per gram before freezing.....	11,600,000
Average bacteria per gram after freezing.....	2,200,000
Average per cent reduction during freezing.....	79.5
Average bacteria per gram after storage.....	1,500,000
Average per cent reduction during storage.....	24.5
Average total per cent reduction during freezing and storage.....	84.1

## BIBLIOGRAPHY

1. Birdseye, Clarence. Some Scientific Aspects of Packaging and Quick-Freezing Perishable Flesh Products. *Indust. & Eng. Chem.*, 21:854, 1929.
2. Berry, James A. Microbiology of the Frozen Pack. *Canning Age*, XIII:251, 1932.
3. Marxer, A. *Beitrage zur Frage des Bakteriengehalts und der Haltbarkeit des Fleisches*. Strassburg, Els-lathr. druckerie, 1903.
4. Weinzirl, J., and Newton, E. B. Bacteriological Analyses of Hamburger Steak with Reference to Sanitary Standards. *A.J.P.H.*, 4, 5:413 (May), 1914.
5. Weinzirl, J., and Newton, E. B. Bacteriological Methods for Meat Analysis. *A.J.P.H.*, 4, 5:408 (May), 1914.
6. Lefevre, E. A. A Bacteriological Study of Hamburg Steak. *Am. Food J.*, 12:140, 1917.
7. Bickert, F. W. Rapid Method for the Determination of the Bacterial Content of Meat and Sausage Products. 2 *Untersuch. Lebensm.*, 59:345-69, 1930.
8. Brewer, C. M. The Bacterial Content of Market Meats. *J. Bact.*, 10:543, 1925.
9. Hoffstadt, R. E. Bacteriological Examination of Ground Beef with Reference to Standard Analysis. I. Relation of Bacterial Count and Aerobic Species Present to Spoilage. *Am. J. Hyg.*, 4:38, 1924.
10. Weaver, R. H. Tests for Incipient Putrefaction. *Agri. Exper. Sta., Michigan State College, Bulletin* 79.
11. Weinzirl, J. Concerning the Relation of Bacterial Count to the Putrefaction of Meat. *A.J.P.H.*, 14, 11:946 (Nov.), 1924.

## The Doctor and His Business

NO, the doctor in the past has not been good at business and most of those who happen to possess that talent soon leave the profession for fields where they more properly belong.

Why he should refrain from forcible collection of his unpaid bills; why he does not patent some of his prescriptions, inventions and discoveries and make a fortune; why he should continue to counteract the spread of diseases he has painfully and at great educational expense learned how to diagnose and treat; why he should so strenuously oppose year after year the efforts of antivivisectionists and antivaccinationists with their Christian Science allies to cripple research and to annul statutes already on the books, knowing his calls would increase did they have their way; and why at the same time he should continue to work longer hours for less pay during a shorter life of activity than most people is an enigma to a hard-headed business man.

To be sure, business is now recognized as one of the professions in certain educational circles, but whether this will elevate the ethics of business which is fundamentally competitive

rather than fraternal, or whether it will undermine the code of medicine remains to be seen. . . .

And since everyone is doing it, how long will the doctors continue as a class to resist? When they no longer do, and adopt the advertising methods of those parasites of the profession, the quack and the patent mediciner, God help the man of modest means and everyone else, whether below him or above him in the social scale, who may some day need a doctor.

The explanation of the doctor's seeming want of business acumen lies partly in the restraining influence of his time-honored precepts of conduct, partly in his preference to hold the respect of his own kind rather than of the financial world, and partly because inherently he's that kind of person else he wouldn't have gone into medicine in the first place. He's already done a great deal not only for the poor, but for the man of modest means as well, and it is offensive to be told by a board of lay people that he's neglecting them.—Harvey Cushing, M.D., Medicine at the Crossroads, *J.A.M.A.*, May 20, 1933, page 1571-72.

# A Plan to Obtain More Accurate Records of Infant Hygiene Field Work\*

C. A. SARGENT, M.D., F.A.P.H.A.

*Director, Division of Child Hygiene, Delaware State Board of Health,  
Dover, Del.*

WHEN a study of the causes of high infant mortality in Delaware was undertaken it was found that the nurses' records were of little value as a source of information. This was due to lack of uniformity, omissions, and masses of meaningless data.

All nurses were interviewed individually regarding the method of recording. In most instances it was their opinion that the records were used as a check-up on the amount of work done rather than the type of field work or the conditions found. For the most part, they had only a vague idea of the number or causes of infant deaths, the number of breast or bottle fed babies, and, with the exception of a few outstanding cases, the conditions in general.

Formerly the plan of operation was as follows. A state law requires attendants at birth to report the birth by post card within 24 hours. From the post cards a list of births in each nurse's district was made up and sent to that particular nurse. This was done before the attendant had issued the birth certificate. From 2 to 6 months later the birth certificate would be sent to the nurse for delivery. The original object in issuing the birth certificate by means of the nurses was to give them a means of entry into the homes, yet by the above mentioned plan the nurse had, in

many instances, visited the home so that the delivery of the birth certificate reverted to the plan of taking a day or two each month simply to go from one home to another to leave the certificate.

In 1930 a different plan was adopted in one county and extended to the entire state in 1931.

The program now in vogue is as follows: All original birth and death certificates go directly to the office of the director of the division of child hygiene. As soon as they are received, the birth certificate is issued, a 5" x 8" child record card for each birth, and an infant death card for each death under 1 year of age and each stillbirth, are typed. All are sent directly to the particular nurse from whose district the reports were received. The clerk in the county unit files the birth cards in the nurse's file. Printed paper duplicates of the child record cards are supplied on which the clerk types the information from the original cards. These duplicates and the birth certificates are given to the nurse. The certificate is delivered when the nurse makes the home visit, and while in the home the nurse writes all data on the duplicate record. These records are then given to the unit health officer who inspects each one carefully to see that the necessary information is given and makes a note on the record when the case is to be seen again, at which time another duplicate record form is given to the nurse. The clerk types the information on the

\* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.





At times the nurses find unreported births. When this occurs a duplicate birth record sheet is made out, and from this an original card, and from the original record a request is forwarded to the State Board of Health for a certificate. The State Board of Health then sends a request to the attending physician for the birth certificate. This is an additional reason for having the father's and mother's names as well as the child's name, and address of the family, "registered" and "attendant" included on the record card. Under "Remarks" the nurses have been instructed to include conditions in the home, coöperation, financial conditions, and all things which in their opinion have direct influence upon the health of the child.

The nurses also include such information as suspected or known cases of tuberculosis, so-called children's diseases, prenatal cases or unreported births in the home or in homes closely adjacent.

The age of the mother is included because a study of the records for the past few years has been carried on to determine whether age of mother at child birth is changing. It is obvious that many items have been omitted. An attempt has been made, however, to obtain as much information as possible having direct bearing upon conditions as found, with a minimum of clerical work.

Several things have been accomplished. The nurses, unit health officers, and the director of child hygiene now have a better idea of conditions existing in each nurse's district. More accurate records are being kept. The infant mortality rate is calculated for each district and causes of infant deaths are discussed with each nurse and a definite program is being formulated. Several unreported births have been found. Without additional personnel, information is being obtained

pertaining to other phases of public health work. Efforts are being made to establish more prenatal and venereal disease clinics.

For the first 6 months each nurse was required to visit the home of every baby twice before the child was 6 months of age, to give the unit officer an idea of conditions. Recently the program has been revised so that to wealthy families the certificate and literature are sent by mail, and the nurse is not required to visit the home unless requested to do so. The nurse visits the homes of the families of moderate means once, at which time she determines whether it is practical or advisable for her to visit the family again. All white families in poor financial circumstances and all colored families are given as much attention as the unit officers think necessary, but all are seen at least twice before the babies are 6 months old. After the first visit, if the mother becomes a regular attendant at the health center the home is not visited unless there is some particular reason for so doing.

Formerly it was the custom of the nurse to devote Saturday mornings and about an hour at the end of each day to clerical work. Under the present plan the nurse is allowed only a short time each day in the office to receive instruction unless a conference is to be held. The clerk has complete charge of the files and they are all kept in uniform order so that a representative from the State Board can obtain a reasonably accurate idea of conditions in any and all districts in a minimum of time.

The nurses are now more keenly interested in preventing as many infant deaths as possible and in finding unreported births, so that the infant mortality rate may be as low as possible in their districts. They are not devoting as much time to work not pertaining to their own field of activities as formerly.

More effective work of the infant hygiene nurses and better records alone will not solve all of our problems in this field, but at least it seems to be a step in the right direction.

Under the present plan of operation we have a better idea of the conditions prevailing and a better basis upon which to construct the infant hygiene program.

## Sweden—Prenatal and Infant Health Work

THE first report on the prenatal and infant health work started by the National Government of Sweden on October 1, 1931, mentions the success of the work and quotes requests from many localities for its continuation. A special committee of experts recommended in 1929 the organization throughout the country of a system of prenatal and infant health work. As a result it was decided to begin the work by way of experiment in four Provinces; the national legislature appropriated the money, and the beginning was made on October 1, 1931. Some time in advance a preparatory campaign was instituted by the Government for the purpose of familiarizing the public with the importance of preventive health work. Notices were printed in the press, literature was distributed, and talks were given by the public health nurses, midwives and others.

The work was of a preventive nature and was concerned with expectant mothers and young mothers and their infants. It was performed by the health officers of the Provinces, who were physicians, with the assistance of the district nurses and district midwives, and was under the supervision of two experts who made inspection tours through the different places. Most of the work was done in rural communities, although a few cities were also included in the territory. Expectant

mothers were given thorough physical examinations and instruction in the proper care of their health by the health officers. Home visits were made by the district midwives. The post-natal care was carried out by the health officers assisted by nurses who also visited the mothers and children at their homes. A certain amount of follow-up work was also done.

The reports for each of the four Provinces where the work was done show that 40 per cent of the expectant mothers and 50 per cent of the newborn infants received preventive care; this, although admittedly not a high percentage, is considered a good showing for a new undertaking, particularly in view of the cold weather, long distances, and bad roads. In general, the public showed great interest in the work and were particularly appreciative of the preventive care, although in some cases the value of the work was underestimated. Some immediate results of the work have already been observed; for instance, greater attention on the part of the mothers to the cleanliness of the infants and of their beds and clothing. On the whole, the experiment is considered sufficiently satisfactory to warrant good expectations for the future.

The National Government has extended its appropriation to July 1, 1933.—*Tidskrift för Barnvård och Ungdomsskydd*, Stockholm, 7, 5, 1932.

# Nonspecific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer

JOHN F. ANDERSON, M.D., F.A.P.H.A., GEORGE F. LEONARD, M.D., AND AUGUST HOLM, Sc.D.

*Biological Laboratories, E. R. Squibb & Sons, New Brunswick, N. J.*

THE titration method by flocculation of diphtheria antigen and antitoxin, has been suggested as an evaluation of the antigenic and antitoxic properties.

The flocculation test has been termed "rigourement spécifique" by Ramon,<sup>1</sup> and the idea has gradually developed that animal tests are unnecessary for the determination of antigenicity and antitoxin unit content, and that the much easier flocculation method can be substituted without loss of accuracy.

## DEVELOPMENT OF THE FLOCCULATION TEST

Early work by Calmette and Massol<sup>2</sup> showed that toxin and antitoxin would flocculate in a test tube when mixed, and a method was developed for the measurement of the antitoxic value of anti-venom by flocculating it in increasing amounts with a constant volume of cobra venom.

Nicolle, Césari and Debains<sup>3</sup> described the flocculation of diphtheria toxin and of tetanus toxin by their homologous antitoxins, but their method of titration involved concentration of the toxin by sodium sulphate, admixture of the concentrated toxin with gelatin, and a ring test with varying dilutions of antitoxin.

Ramon<sup>4</sup> developed a simple method

by which he determined the number of antitoxic units of diphtheria immune sera, and the antigenic value of diphtheria toxins and toxoids. Serum and antigen were mixed in different proportions in test tubes, and the tube which flocculated first was selected as containing a neutral mixture of antigen and serum—Ramon's "flocculation initiale."

Ramon's work was soon confirmed by Schmidt,<sup>5</sup> Scholz,<sup>6</sup> Glenney and Okell,<sup>7</sup> Bayne-Jones,<sup>8</sup> and many other investigators, and the flocculation (Lf) value was defined as the amount of toxin, equivalent to one unit of antitoxin as determined by flocculation. The Lf value of a toxin or a toxoid is frequently referred to as "antigenic value" or "immunizing value."

## RELATION OF FLOCCULATION TO PRECIPITIN TEST

Soon after Ramon's publication, several workers, however, raised the question whether the flocculation reaction really was different from the well known precipitin reaction, which generally takes place between an antigen and its homologous antibody.

Bronfenbrenner and Reichert<sup>9</sup> studied botulinus toxin and came to the conclusion that the amount of flocculation and the width of the flocculating zone varied approximately with the esti-

mated amount of bacterial protein in the toxic filtrate, and that the flocculation of toxin with antitoxin was a specific bacterial precipitation phenomenon.

Moloney and Weld<sup>10</sup> found that there was "no obvious relation between the agglutination titer of a serum and its antitoxic content."

Schmidt<sup>11</sup> also observed that the precipitate which forms when antibacterial precipitin is added to diphtheria toxin does not remove the toxin nor interfere with its subsequent flocculation with antitoxin. A new flocculation occurs when the toxin, from which precipitable bacterial residues have been removed, is added in equivalent proportions to the antitoxin. After removal of the precipitate formed by antitoxin in the "indicating tube" showing the "flocculation initiale," no further flocculation occurs when more antitoxin is added. Bayne-Jones<sup>12</sup> has confirmed these experiments and demonstrated the independence of the toxin-antitoxin flocculation with reference to bacterial proteins.

#### DISCREPANCIES IN THE FLOCCULATION TEST

Glenny,<sup>13</sup> and Glenny and Wallace<sup>14</sup> state that the flocculation reaction sometimes would give widely diverging values when compared with animal tests. For example, the flocculation value of a serum was 160 units, while animal tests showed that the serum contained 260 units.

The authors of the present paper have repeatedly made similar observations on titrations of trial bleedings. For instance, the flocculation value for one horse was 550 units, while the guinea pig tests showed more than 1,100 units.

Another source of discrepancies is the zone phenomenon, where flocculation occurs in two or more zones with the same amount of toxin, but with

different amounts of antitoxin. This phenomenon is especially prevalent in the flocculation of mixtures of tetanus toxin and antitoxin,<sup>15</sup> on account of which the tetanus flocculation has not been accepted as a measure of antigenic and antitoxic units; but the zone effect is occasionally met also in the flocculation of diphtheria antigen and antitoxin.<sup>16</sup>

Povitsky<sup>17</sup> relies almost entirely upon the Ramon flocculation test for the titration of toxoid, and she states that since 1924 this test has been used in all phases of toxin, toxoid, and antitoxin production for the determination of antigenic and antitoxic units. She is of the opinion that the discrepancies between guinea pig and Ramon test noticed usually are due to the wrong proportions of toxin and antitoxin, and explains it as follows:

When a serum gives a reaction at the usual temperature with the standard toxin in 2, 3, or more hours, when it should give it in 1 hour, we know that the amounts of toxin and antitoxin are not proportionate. The test is repeated several times until the reaction is obtained within the proper time. The Ramon test, when the amounts of toxin and antitoxin are proportionate is, in the opinion of the author, one of the most reliable we have. The reactions which occur later on either side of the indicating tube are not specific and may lead to wrong calculations.

In this connection it may be stated that some horses may give antitoxic sera that flocculate in 2 hours,<sup>18</sup> 3 hours, and 6½ hours,<sup>19</sup> and that flocculation time is greatly influenced by the temperature of the water bath in which the flocculating tubes are immersed.

Linderström-Lang and Schmidt<sup>20</sup> prepared a purified antitoxin by alcohol precipitation and ether extraction which did not flocculate, but had retained its avidity and neutralizing power for toxin.

Jensen<sup>21</sup> calls attention to investiga-

tions carried on at the State Serum Institute at Copenhagen, according to which the correctness of Ramon's contention, that the flocculation value is an expression of the immunizing power, must be considered questionable.

Bächer and Kraus<sup>22</sup> caution against the identification of flocculation with toxin-antitoxin binding, and have prepared antigenic diphtheria toxins which did not flocculate.

In the concentration and purification of diphtheria toxin and toxoid, this lack of power to flocculate is often encountered, although the antigenicity is retained or only somewhat diminished.<sup>16, 23</sup> This is, for instance, the case in the purification by alcohol, by acids, and by combined acid and alcohol precipitation.<sup>24</sup>

On the other hand, Gross,<sup>25</sup> and later Ecker and Weed,<sup>26</sup> purified diphtheria toxin by adsorption to magnesium hydroxide and colloidal magnesium, but although their purified product contained about 32 "antigenic" (flocculation) units per c.c., which value was determined by Povitsky, the purified toxin was completely lacking in antigenicity, being incapable of immunizing rabbits and guinea pigs.

Not only absence of ability to flocculate, with retained immunizing power, and high flocculation values with lacking antigenicity are found, but non-specifically increased flocculation values are also encountered.

When toxins and toxoids, which have been purified by adsorption to aluminum hydroxide,<sup>24</sup> are eluted by a solution of disodium phosphate and the elution is made up to the original volume, the flocculation value will in some instances be increased to much more than 100 per cent, while the flocculation time is considerably decreased. Figures on record show that a toxoid which originally flocculated 12.4 units per c.c. in 2 hours and 6

minutes increased its flocculation value to 17 units in 25 minutes, although it was evident from animal experiments that the recovery of the toxoid from the precipitate by elution was far from complete.

It has always been the object to produce as strong a toxin as possible for the production of antitoxin, and the increasing use of toxoid of high antigenic value for immunization against diphtheria has stressed the demand for strong toxin. A toxin containing 10 to 15 flocculation units was until lately considered a strong toxin, but it is now possible to make toxins of 60 flocculation units<sup>27</sup> or even more,<sup>28</sup> and concentrated toxins and toxoids of several hundred units.

The chemical composition of the floccules which are formed when diphtheria toxin and antitoxin are mixed in suitable proportions has been investigated by Flössner and Kutscher<sup>29</sup> who found that the floccules consist of 86.36 per cent magnesium ammonium phosphate, 10 per cent alcohol-insoluble protein, 1.1 per cent alcohol-soluble protein, and 2.52 per cent lipid.

The organic constituents of the floccules have been attributed to bacillary lipoprotein and serum precipitins, and Moloney and Weld<sup>10</sup> suggested that the toxin-antitoxin complex merely was carried down by adsorption. Hartley<sup>31</sup> proposed that the toxin-antitoxin compound was adsorbed upon lipoids which became flocculated from the serum during the reaction, and Friedberger and Ikeda<sup>32</sup> were of the opinion that the toxin-antitoxin complex was largely a lipoidal aggregate.

It may be mentioned in this connection that Lohmann<sup>30</sup> has demonstrated the presence of pyrophosphates in striated muscle, in yeasts, and in bacteria. Pyrophosphates will react with magnesium compounds and form precipitates which are soluble in an excess of pyrophosphate solution, as well as in

TABLE I  
FLOCCULATION DETERMINATIONS

2 c.c. of	Amount of Antitoxin etc. in 0.001 c.c.						Time	Antitoxin etc.	Indicated Units
Saline with 0.1% Sod. Pyroph.	2,000	1,500	1,000	750	500	250	2 m.	1,389	>400
Saline with 0.025% Sod. Pyroph.	2,000	1,500	1,000	750	500	250	3 m.	1,389	300
Saline with 0.0175% Sod. Pyroph.	1,200	1,100	1,000	900	800	700	12 m.	1,389	180
Saline with 0.01% Sod. Pyroph.	2,000	1,500	1,000	750	500	250	25 m.	1,389	150
Saline with 0.005% Sod. Pyroph.	700	600	500	400	300	200	18 h.	1,389	80
Saline with 0.1% Sod. Pyroph.	2,000	1,500	1,000	750	500	250	12 m.	Normal Serum	>400
2% Peptone with 0.05% Sod. Pyroph.	1,250	1,000	750	500	250	100	10 m.	1,389	200
2% Peptone with 0.025% Sod. Pyroph.	1,250	1,000	750	500	250	100	23 m.	1,389	100
4% Peptone with 0.05% Sod. Pyroph.	1,250	1,000	750	500	250	100	15 m.	1,389	200
4% Peptone with 0.025% Sod. Pyroph.	1,250	1,000	750	500	250	100	33 m.	1,389	100
6% Peptone with 0.05% Sod. Pyroph.	1,250	1,000	750	500	250	100	12 m.	1,389	175
6% Peptone with 0.025% Sod. Pyroph.	1,250	1,000	750	500	250	100	17 m.	1,389	75
2% Peptone with 0.05% Sod. Pyroph.	1,250	1,000	750	500	250	100	11 m.	Normal Serum	>250
B. Coli protein(a) solution	50	40	30	20	10	5	18 h.	1,389	7
B. Coli protein with 0.05% Sod. Pyroph.	2,000	1,500	1,000	750	500	250	6 m.	1,389	300
Staph. Aur. protein solution	50	40	30	20	10	5	No flocc.	1,389	—
Staph. Aur. protein solution with 0.05% Sod. Pyroph.	1,500	1,250	1,000	750	500	250	1 h. 35 m.	1,395	100
B. Diph. protein Solution(b)	275	250	225	200	175	150	8 m.	14,505	45
B. Diph. protein Solution with 0.05% Sod. Pyroph.	2,000	1,500	1,000	500	250	100	6 m.	1,395	250
Toxoid 14,957 (Untreated)	70	68	66	64	62	60	2 h. .06 m.	14,505	12.8
Toxoid 14,957 with 0.01% Sod. Pyroph.	1,600	1,400	1,200	1,000	800	600	12 m.	1,395	240
Toxoid 14,957 with 0.025% Sod. Pyroph. and an equal volume of 2% peptone solution	2,000	1,750	1,500	1,000	750	500	6 m.	1,395	150
Toxoid 14,957 with an equal volume of B. diph. protein sol.	175	150	125	100	75	50	3 h. 44 m.	14,505	39
Toxoid 14,957 with 0.025% Sod. Pyroph. and an equal volume of Staph. Aur. protein solution	175	150	125	100	75	50	2 h. .05 m.	14,505	20
Toxoid 14,957 with 0.025% Sod. Pyroph. and an equal volume of B. C. li protein solution	175	150	125	100	75	50	8 m.	14,505	25

The figures in italics denote the indicating tube.

(a) Flaky flocculation.

(b) Copious flocculation.

an excess of the solution of the magnesium compound. By using pyrophosphate and magnesium in colloidal suspensions, or as compounds where they are chemical components of pro-

tein, and employing them according to the Ramon flocculation method, flocculations take place especially in the presence of ammonia salts which are indistinguishable from flocculations of

toxin and antitoxin. There is the same "flocculation initiale" as demonstrated by Ramon, with an "indicating tube," and a supernatant liquid which after removal of the precipitate is free for flocculation producing compounds.

#### EXPERIMENTAL

*Non-specific Flocculation*—The general application of the flocculation test in the production of toxin and antitoxin, makes it necessary to know as much as possible about factors which may cause non-specific reactions and consequently erroneous calculations, so that these irregularities may be detected or guarded against.

Observations at this laboratory show: (1) that the flocculation value of a 2½ year old toxoid does not always correspond to the value established by animal tests, but may give a low flocculation value and yet be of satisfactory antigenic activity; (2) that the flocculation of a fresh toxin also occasionally may show irregularities with high flocculation value and lower toxicity than expected according to the flocculation test; (3) that precipitation of extracts of diphtheria bacilli readily takes place with homologous serum, often simulating a true flocculation; and (4) that toxin broth, which accidentally had become contaminated during the production of diphtheria toxin showed higher flocculation values than the uncontaminated flasks.

In view of these facts, and as elutions of toxoid precipitates by disodium phosphate gave too high flocculation values, as floccules largely consist of magnesium ammonium phosphate, as pyrophosphates are present in meat and bacteria, and as pyrophosphates will flocculate with magnesium compounds, a number of flocculations were carried out to determine the influence of the pyrophosphates on the flocculation values. Diphtheria toxins, toxoids, and antitoxins, and different proteins have been

mixed with sodium pyrophosphate, with magnesium sulphate and with colloidal magnesium, and flocculated according to Ramon's method.

*Technic*—The volume of toxin in each tube was 2 c.c. The test tubes were 10 cm. long and 0.73 cm. in diameter. The pipetting was done with 0.1 c.c. pipettes, which are graduated in 0.001 c.c., and the pipettes were wiped off with moist cotton after each immersion into the antitoxin. The water bath was kept at 50° C., and the amount of water in the bath adjusted to cover half of the column of fluid in the tubes.

Some typical flocculations are recorded in Table I and the following reagents were used:

Saline was a 0.85 per cent solution of sodium chloride.

The peptone is "Proteose Peptone" from Digestive Ferments Co., Detroit, and was dissolved in saline.

The bacterial protein solutions were neutral, acid and alkaline saline extracts.

The toxoid 14,957 was made from infusion free medium.<sup>83</sup>

All antitoxins used contained 400 units.

#### DISCUSSION

It is apparent that pyrophosphates may simulate a true flocculation, and that the addition of pyrophosphates to diphtheria toxin and toxoid can modify the flocculation values.

Since analysis of the floccules in the ordinary flocculation of antitoxin by toxin shows that the floccules mainly consist of magnesium ammonium phosphate, it does not seem improbable that the true flocculation of mixtures of toxin or toxoid and antitoxin is in some way connected with phosphate-magnesium precipitation in the presence of ammonia. Phosphates are present in all media used for the production of toxin, magnesium is a constituent of antitoxin, and ammonia is a metabolic product of the diphtheria bacilli.

It seems therefore as if the flocculation reaction might consist of three different but interlocking reactions: first, a phosphate-ammonium-magnesium reaction; secondly, a bacillary lipoprotein-nucleoprotein-precipitin reaction; and, thirdly, a neutralization of toxin or toxoid by antitoxin. Flocculation, therefore, may be a simple neutralization of toxin or toxoid and antitoxin, or it may be a combination of neutralization and a non-specific reaction, or a non-specific reaction alone.

Since the avidity of a toxin or a toxoid may be changed and considerably lowered by purification, which also removes most of the inorganic constituents, or may be increased as shown by decreased flocculation time, for example, in the case of phosphate elution of toxoid precipitated by aluminum hydroxide, the avidity phenomenon may be more complex than is usually considered. It may, to a certain degree, depend also upon inorganic compounds, which possibly are present as integral parts of the toxin and the antitoxin.

#### SUMMARY

1. The Ramon flocculation test of diphtheria toxin or toxoid and antitoxin has been claimed to be rigorously specific. Certain non-specific flocculations are, however, encountered, as for example by bacillary proteins, by phosphates and pyrophosphates.

2. Phosphates and pyrophosphates may under certain circumstances enhance the flocculation reaction of diphtheria toxin and antitoxin. This enhancement is expressed by increased flocculation value and decreased flocculation time.

3. The flocculation reaction consists possibly of interlocking reactions of inorganic constituents of the toxin and serum, of bacillary lipoproteins or nucleoproteins and serum precipitins, and of toxin and antitoxin.

Flocculation may be a simple neutralization of toxin or toxoid and antitoxin, or it may be a combination of neutralization and a non-

specific reaction, or a non-specific reaction alone.

4. The flocculation reaction is not always specific and, therefore, is not always a true measure of the antigenic value.

5. The flocculation time is not always a true measure of avidity, as determined by flocculation.

#### REFERENCES

1. Ramon. Congress Int. Soc. Microbiol., Paris, 1930. Tome I.
2. Calmette and Massol. *Ann. de l'Inst. Pasteur* 23:155, 1909.
3. Nicolle, Césari and Debains. *Ann. l'Inst. Pasteur* 34:596, 1920.
4. Ramon. *C. r. Soc. Biol.* 86:661, 1922; 86:813, 1922; 89:2, 1923.
5. Schmidt, S. *C. r. Soc. Biol.* 88:105, 1923.
6. Scholz. *Centralbl. f. Bakteriologie*. I Abt. Orig. 91:72, 1923.
7. Glenny and Okell. *J. Path. & Bacteriol.* 27:187, 1924.
8. Bayne-Jones. *J. Immunol.* 9:481, 1924.
9. Bronfenbrenner and Reichert. *J. Exper. Med.* 44:553, 1926.
10. Moloney and Weld. *J. Path. & Bact.* 28:655, 1925.
11. Schmidt, H. *Ztschr. f. Immunitätsforsch. u. exper. Therap.* 48:217, 1926.
12. Bayne-Jones. *The Newer Knowledge of Bact. and Immun.*, by Jordan & Falk, 1928, p. 762.
13. Glenny. *J. Path. & Bact.* 28:130, 1925.
14. Glenny and Wallace. *J. Path. & Bact.* 28:317, 1925.
15. Schmidt, S. *Ann. de l'Inst. Pasteur* 48:63, 1928.
16. Schmidt and Scholz. *Arch. f. Hyg.* 96, 1925.
17. Povitsky. *A.J.P.H.* 22, 1:29 (Jan.), 1932.
18. Schmidt, S. *Act. Path. & Micr. Scand.* 8:185, 1931.
19. Locke, Main and Miller. *J. Infect. Dis.* 41:32, 1927.
20. Our own observation.
21. Linderström-Lang and Schmidt. *Kolloid Ztsch.* 51:152, 1930.
22. Jensen. *Act. Path. and Micr. Scand.* 10:137, 1933.
23. Bücher & Kraus. *Centralbl. f. Bakteriologie*. I. Abt. 110:142, 1929.
24. Schmidt and Hansen. *Biochem. Ztschr.* 228:263, 1930.
25. Leonard and Holm. In press.
26. Gross. *Proc. Soc. Exper. Biol. & Med.* 26:696, 1929.
27. Ecker and Weed. *J. Immunol.* 22:61, 1932.
28. Pope and Smith. *J. Path. & Bact.* 35: 573, 1932.
29. Private communication from Dr. C. G. Pope.
30. Flössner and Kutscher. *München med. Wochenschr.* 71:576, 1924.
31. Lohmann. *Biochem. Ztschr.* 202:466 and 203:164, 1928.
32. Hartley. *Brit. J. Exper. Path.* 6:180, 1925.
33. Friedberger and Ikeda. *Klin. Wochenschr.* 4:2149, 1925.
34. Kirkbride, Berthelsen and Clark. *J. Immunol.* 21:1, 1931.



# Prevention of Lead Poisoning in Industry\*

G. H. GEHRMANN, M.D., F.A.C.P.

*Medical Director, E. I. du Pont de Nemours & Co., Wilmington, Del.*

THE discussion of this subject, which is probably one of the oldest, if not the oldest, of known industrial hazards, hardly calls for an introduction dealing with its history. No one will dispute the fact that prevention is the only remedy that can be considered as practical.

I propose to present the methods of prevention which have been in actual operation in our company since 1926, as devised by our own Medical Department with the assistance of Dr. Robert A. Kehoe, of Cincinnati, Ohio, in the manufacture of tetra ethyl lead. I have chosen this particular operation because it represents the manufacture and handling of one of the most dangerous lead compounds in industry, being highly toxic by all 3 avenues of entrance, viz., the gastrointestinal tract, the respiratory tract, and the skin. This is the only known lead compound to enter the circulation by the latter route in sufficient quantities to cause poisoning. Since the adoption of preventive measures as formulated in 1926 this operation has been conducted up to the present time without a single case of lead poisoning, and in only a very few instances sufficient absorption to warrant the removal of a man from work. I do not mention these facts in an attempt to glorify our records, but simply to call to your attention that, no matter how toxic the substance,

it can be produced and handled safely under the proper precautionary measures.

Preventive measures are divided into two major classes—those applicable to the workmen, and those of operation. All methods of both classes must be carefully planned, rigidly enforced and maintained with the utmost care.

The methods and rules applicable to the workmen are the most detailed and the most difficult to maintain. They begin with a physical examination before the workman is allowed to enter the plant. The examination must be made with great care, and sufficient time allowed to cover intimate and essential details. I do not propose to enter into a detailed description as to how a physical examination should be made; but I wish to point out a few details that require careful analysis.

The first essential is a complete history of the applicant's previous industrial life, covering his entire working period from the beginning and up to the time of his examination. This history must be very carefully taken and any previous exposure to lead is a definite contraindication to acceptance unless the examiner can assure himself that the exposure was insufficient to have caused appreciable absorption or the industry in which he was employed gave sufficient protection to prevent absorption. Both of these questions are difficult to answer satisfactorily, and I simply mention them as possible qualifications to acceptance. It is unsafe, and decidedly dangerous to the appli-

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

cant, and a potential hazard to the employer, to accept an applicant who is already leaded to any degree.

There are certain characteristics which if recognized should be sufficient to exclude the applicant. For example, the lead worker must be amenable to the teachings of cleanliness and sanitation, and the individual whose appearance indicates chronic slovenliness is always a difficult problem and may, in spite of your best efforts, succeed in getting himself into serious difficulties. The irresponsible and, to use the common expression, the "wise guy," will invariably fail to follow instructions and often take keen delight in disobeying them. It is often impossible to impart understanding to one who has insufficient powers of absorption and retention. I refer to those whom we classify as decidedly below normal intelligence. These facts are decidedly pertinent to successful continuance of the operation, because the rules and regulations are numerous and are the very foundation of successful prevention of lead absorption, and each employee must carry out his own particular rôle with exact precision at all times.

Females, and all applicants under 21, are recognized as decidedly prone to lead poisoning, and should be excluded. Also, I feel that applicants over 45 should be eliminated.

After ascertaining these facts, and before making the actual physical examination, the applicant should have carefully explained to him (1) the danger of the operation for which he is being considered; (2) that he will have to work under definite rules which are for the protection of his health, and failure to obey them will mean the possibility of his own illness or dismissal; (3) that the Medical Department is operating for his protection and he is free at any time to present to it complaints of any nature relative to his own personal health, and always on the

company's time. This last point is extremely important, as I have found it very difficult and almost impossible to get workmen to sacrifice even a few minutes of their own time.

Immediately following this explanation of danger, the applicant should be asked whether or not he is desirous of working under such conditions, and he is dismissed from further consideration if his answer is negative or if he expresses fear. Employees who are afraid of lead work are very liable to be constantly presenting subjective symptoms with no objective findings, and soon become a problem to the examiner.

The personal history should bring out certain facts, such as the presence of chronic gastrointestinal disorders, gastric or duodenal ulcer, bowel habits and appetite, with special reference to breakfast. The average workman eats a good breakfast, and one of the early subjective symptoms of lead poisoning is a lack of early morning appetite. Sleep and its nature should be recorded, as insomnia and dreams are early symptoms of lead poisoning. The particular point that I am trying to make is this—if you record a complete history at the time of employment, it is easy to check any alleged changes later, but without the initial record you will find it extremely difficult to arrive accurately at definite conclusions.

The actual physical examination is conducted in the usual complete manner, and bearing in mind the general toxic effects of lead there are many conditions that necessitate rejection of the applicant, such as circulatory disturbances of any nature, nephroses, acute or chronic infections, syphilis, diabetes mellitus, neurological disturbances of any kind, anemias, and carious teeth until repaired. It is our policy to have the teeth of our men, after acceptance, examined, cleaned and repaired by our own dentist, who

operates at our plant on a full-time basis.

A complete blood count must be made at this time with a careful search for stipple cells, for future comparison. We have often found applicants showing numerous stipples who have denied previous lead exposure, usually intentionally. The presence of stipple cells is sufficient cause for rejection.

The applicant who has passed this physical examination must be in good physical condition, and from this point on it is the moral and legal obligation of the employer to exert every possible human effort to maintain and protect his health by (1) careful and frequent medical examinations, (2) rigid rules of conduct during working hours, and (3) installation and maintenance of proper mechanical protective and operative devices.

#### MEDICAL EXAMINATIONS

The frequency of medical examinations is, in all industrial hazards, determined by the toxicity of the material being handled, the possibility and rate of absorption, and the minimum time in which physical signs and symptoms may appear. We made our lead examinations weekly for several years, and by virtue of our experience have now changed the schedule to every 3 weeks.

Each examination consists of a careful search for subjective and objective signs of lead absorption, including a complete blood count, with a careful search for stipple cells. In our stipple cell counts we examine 50 oil immersion fields, and consider the presence of these cells as indicative of lead absorption, but regardless of the number, in no way indicative of the degree of absorption. The degree or severity of lead absorption must be decided by the presence of subjective or objective symptoms and signs, either one or both, together with blood changes as deter-

mined by a reduction in the hemoglobin, a reduction in the number of red cells and the presence of any number of stipple cells.

The periodic lead examinations must be conducted on a regular schedule and in the event of any doubt or suspicion as to the presence of even very slight signs or symptoms, the patient should be immediately subjected to daily observations until his condition is definitely determined. It is most difficult to set up any definite standard for determining when a man has absorbed sufficient lead to warrant his removal from the work, in order to prevent the appearance of symptoms. In general, I believe it safe to say that when a worker begins to show even a slight digestive change, has lost a little weight, lacks a noticeable degree of his original stamina and shows stipple cells with some reduction in the number of the red cells and hemoglobin, he should be removed. To some this might seem like the actual presence of lead poisoning rather than lead absorption, but regardless of the degree, this type of worker can be changed to a lead-free occupation without any loss of time and in a relatively short period be entirely symptom free. In other words, he has not been poisoned to the point of invalidism, has not suffered any lasting effects and can be eventually returned to his original work. The occurrence of absorption in sufficient degree to warrant removal indicates faulty operative methods or failure to follow working rules, and calls for immediate investigation to determine the real source of the trouble and the application of proper remedies.

I should say something about the estimation of lead in the urine and feces. We do not make these estimations as a routine because we are convinced that our examining technic is sufficiently thorough to detect any appreciable degree of lead absorption, and

there are too many details and too much time is involved in making these tests properly to warrant the expense. The amount of lead in the feces is not a true indication of the amount absorbed as it is impossible to determine how much has passed directly through the intestinal tract and how much has been excreted. Lead in the urine must necessarily represent lead that has been absorbed, but before a worker is excreting sufficient quantities to denote lead poisoning he should have been eliminated by the physical examination.

#### RULES OF CONDUCT

Before stating any rules that govern the daily conduct of lead workmen, I wish to call your attention to the fact that before these can be properly enforced, each worker must be carefully instructed in each individual rule, and must be supplied with certain necessities that will enable him to follow out every detail. He cannot take a bath unless provided with the proper means, neither can he put away his street clothing if there is no place to put it, and unless provided with a lunch room he is apt to eat in any convenient place. I have seen factories where the rules of conduct were quite adequate, but the management had made no provision for the equipment necessary, thus making them a mere gesture toward precaution.

The first necessity is a proper change house, and I strongly recommend that the house have two locker rooms, one for the street clothing and the other for the working clothes, and adjoining or between them washing and bathing facilities. Shower baths should be attractive and sanitary in construction, and above all should be kept clean and orderly. A lunch room in the change house is the ideal location as it gives each worker the opportunity of storing his lunch in his own locker and provides the necessary washing facilities which he must use before eating.

Rules which each lead worker in our employment must follow are:

1. Before going to work each man is given two clothing lockers located in different rooms, one to be used for street and the other for working clothing.

2. Each day before reporting for work he must remove all street clothing and put on a complete working outfit. We supply these outfits, 2 to each man, and they are washed in our laundry twice a week, at company expense.

3. At the end of each day every man must take a shower bath.

4. No food of any kind may be taken into or consumed in the lead buildings. All lunches must be eaten in rooms provided for this purpose and each man must wash his face and hands before eating.

5. Each worker must carefully obey all the rules of operation and immediately report the faulty operation of any equipment.

6. Every worker must report to the Medical Department when sent for and at any time when he does not feel well.

7. Anyone who is unable to report for duty for any reason whatsoever, unless previous arrangements have been made, must communicate with his foreman on the day of his absence and give his reason for failure to report. This rule keeps us in constant contact with every worker and when he reports sick his case is immediately investigated by our Medical Department.

The adoption of working rules and the institution of employment and periodic examinations may be safely considered as essential in all lead operations, but must always be supplemented by factory control methods of operation. I have frequently heard it said that sanitary rules are sufficient to control any lead operation, and I very definitely deny this assertion. The most rigid examinations and the most elaborate sanitary working rules will not prevent lead absorption and lead poisoning in a dirty operation, and by this I mean one where lead dust or fumes are constantly in the air.

A great deal has been written relative to the exposure necessary to produce lead symptoms and it is generally accepted that the absorption of from

1 to 2 milligrams per day will cause lead poisoning in from 9 months to 1 year, while the absorption of 10 milligrams per day will cause acute poisoning in a few weeks. However, when we take into consideration certain unknown factors such as personal susceptibility, rate of absorption and tolerance together with the amount of air contamination, as carefully measured by chemical analysis, it is impossible to state definite figures in milligrams per cubic meter which may be considered safe for any group of workmen. This being the case, the only safe method of operation is the one in which the lead content of the air is reduced to the absolute minimum. I question the possibility of absolute freedom of lead dust and fume in certain types of operations, at least with the present available equipment.

There has been much discussion as to the comparative toxicity of various lead compounds and here we are dealing, not with the toxicity of the actual material, but with the amount that is being absorbed, and the safest method is to consider them all toxic and institute measures that will give minimum absorption.

The two major industrial problems are elimination of dust and fumes. Dust problems have two main points of origin—the method of handling materials, and process machinery. The handling of dry, dusty lead compounds can be controlled to a certain degree by instituting a careful method, but these measures tend to slow up the operation and are always dependent upon careful supervision at all times, as the human element of carelessness is certain to become troublesome. The use of respirators is fairly satisfactory provided the respirator is efficient, comfortable to wear, and is worn at all times. Anyone who has had experience with respirators must admit that under the most favorable circumstances they

leave much to be desired. This narrows the field down to the most efficient and satisfactory method of dust control at the point of origin, which is exhaust ventilation.

Exhaust ventilation, properly designed and properly maintained, will reduce dust hazards to the absolute minimum. The type of hoods, the rate of exhaust, and all other problems in connection with the operation can be readily solved by ventilating engineers. The consideration of these details is an engineering problem, not a medical one. Our own experience has proved that although the initial installation is somewhat expensive, the final results amply justify the cost. Exhaust ventilation not only controls the dust problem but also the fumes. In our lead ethyl operations we have surrounded practically every piece of equipment and, in addition, force fresh, clean air into all workrooms in sufficient quantity to make two complete changes each minute.

I realize that there are a great many companies handling various lead compounds at present whose operations are hazardous to the employees and who because of present business conditions cannot spend the necessary money to install either new equipment or exhaust ventilation. Such operations should be cleaned up in so far as possible by tightening up all equipment, instituting careful methods of handling materials, careful rules of sanitation for the workmen, and competent medical supervision.

Cleaning and keeping clean all factory workrooms is extremely important. Dry sweeping should never be allowed. Floors and equipment should be washed down whenever possible; and under circumstances which do not permit of the use of water, vacuum cleaning is the method of choice. A few dry sweepings can soon undo all the good accomplished by months of careful observation

and sanitary control. Rafters, beams, windowsills, and all dust collecting parts must be kept free from dust to prevent air contamination by draughts and jarring caused by the vibrations of the equipment.

Chemical analyses to determine the lead content of the air should be made very frequently at all parts of the work-rooms; must be conducted by a trained individual; and a record of each test supplied to the Medical Department, as they indicate those operations or sections of operations where trouble is most likely to occur. They also make it possible to pick out the workmen who are subjected to these conditions and watch them more carefully for lead absorption. Such tests act as a check upon the efficiency or lack of efficiency

of machinery and exhaust ventilating devices, and indicate the necessity for immediate improvement. I cannot lay too much stress upon the real value and the urgent necessity of air analyses in any lead operation, and I am convinced that the expense incurred is many times compensated for by the actual benefits which result by following up and stopping the leaks that are detected.

In conclusion, I would say: Pick your workmen carefully by complete examinations; instruct them thoroughly in the rules that must be followed all during their working hours; and eliminate dust and fumes at the source. If you do all these things properly, lead absorption will be reduced to a minimum and you should eliminate all cases of lead poisoning.

---

## Antituberculosis Work Among Children in Italy

IN a recent circular to the local anti-tuberculosis committees, which in compliance with the law on compulsory insurance against tuberculosis have been organized throughout Italy, the Minister of the Interior urges the application of preventive measures, particularly to children who have tuberculous parents or who live with tuberculous persons.

Preventive action must begin as early as the prenatal period. It is necessary to search for expectant mothers affected with tuberculosis and to provide for them the necessary treatment, whether in a hospital or, if advisable, in their homes. The infant living with a tuberculous mother or in the same home with another tuberculous patient must be supervised either by the family

physician or by a physician from the public tuberculosis clinic. Visiting nurses must teach these mothers proper care of their infants. In a case in which it is not advisable to leave the infant in his own home, he should be placed in an appropriate public institution; the local branch of the National Children's Bureau should then be asked to coöperate with the local official anti-tuberculosis committee.

The Minister also calls the attention of the authorities to the importance of providing physical examinations for all school children and treatment for all active cases of tuberculosis among them and of establishing open-air schools for undernourished children and those suspected of tuberculosis.—*Le Assicurazioni Sociali*, Rome, 8, 5, 1932.

# Agglutination in the Diagnosis of Enteric Disease\*

RUTH GILBERT, M.D., F.A.P.H.A. (*Life Member*),  
AND MARION B. COLEMAN

*Division of Laboratories and Research, New York State  
Department of Health, Albany, N. Y.*

POLICIES adopted in 1913, when the New York State Department of Health was reorganized and Dr. Hermann M. Biggs was appointed Commissioner of Health, have resulted in the development of a highly efficient laboratory service throughout the state. A unique opportunity has thus been provided for the evaluation and establishment of standards, through the coöperation of directors of laboratories approved by the State Commissioner of Health with the staff of the central laboratory in Albany.

One of the most difficult procedures to standardize has been the agglutination test for evidence of typhoid fever. Microscopic tests with living organisms made in 2 laboratories where the same technic is employed and the same strain of *B. typhosus* is used may furnish different results with portions of the same blood specimen, even though the cultures are maintained under the most carefully controlled conditions. Moreover, the value of this type of test as an aid in diagnosis is limited, since similar reactions may be obtained with the

blood of persons who have typhoid fever, who have received typhoid vaccine, or who have a febrile disease other than typhoid fever.

The substitution of a carefully

TABLE I  
AGGLUTINATION REACTIONS WITH TYPHOID  
BACILLI OBTAINED IN 230 SPECIMENS  
OF SERA FROM 209 PATIENTS  
WITH TYPHOID FEVER

Highest dilution in which complete or nearly complete agglutination occurred	Microscopic test with living culture	Macroscopic test with suspensions treated with	
		Alcohol	Formalin
1:1,200 or higher	6	10	2
1:640	6	19	14
1:320	32	90	60
1:160	56	51	42
1:80	52	35	52
1:40	41	12	30
1:20	25	4	10
No agglutination	12	9	20

Read before the Laboratory Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

standardized suspension of killed bacteria would lead to greater uniformity and could be recommended if reliable results could be obtained with it. Cultures killed with formalin have been extensively studied and their use has been advocated by a number of investigators. The findings obtained in our laboratory indicated that such suspensions were not satisfactory for the microscopic test.<sup>1</sup> Also, in macroscopic tests, occasionally sera from patients with typhoid fever failed to agglutinate suspensions killed with formalin when reactions were secured in tests with a living culture.

The importance of 2 types of agglutination which can be demonstrated with many species of bacteria was not fully appreciated for a number of years after Theobald Smith and his collaborators<sup>2</sup> had demonstrated, in 1903, that a nonmotile strain of the hog-cholera bacillus agglutinated in the form of a "granular precipitate," while motile strains of the same species agglutinated as a "fluffy precipitate." In 1917, Weil

and Felix<sup>3</sup> investigated these properties of *B. proteus* and later they,<sup>4,5</sup> as well as a number of other workers, made similar studies of species belonging to the enteric disease group. It was learned that data of greater diagnostic value could be secured by a method differentiating the granular from the floccular type of agglutination than by the microscopic test with living culture.

In view of these reports, during the last 3 years the microscopic test with living culture has been supplemented in our laboratory by a macroscopic test with an alcohol treated suspension, which agglutinates in a granular form, as well as one with bacteria killed with formalin, which agglutinates in a floccular manner.<sup>6</sup> Last year, the New York State Association of Public Health Laboratories, an organization which has been most influential in the maintenance of high standards of laboratory service in the state, undertook a joint investigation of this problem. Sera from cases of enteric disease, from patients with various other types of febrile disease, and from typhoid carriers are included

TABLE II

AGGLUTINATION REACTIONS WITH TYPHOID BACILLI OBTAINED IN 7 SPECIMENS OF SERA FROM 6 PATIENTS WITH PARATYPHOID FEVER

Highest dilution in which complete or nearly complete agglutination occurred	Microscopic test with living culture	Macroscopic test with suspensions treated with	
		Alcohol	Formalin
1:160	1	2	0
1:80	3	2	0
1:40	1	2	5
1:20	0	0	0
No agglutination	2	1	2

TABLE III

AGGLUTINATION REACTIONS WITH TYPHOID BACILLI OBTAINED IN 9 SPECIMENS OF SERA FROM 6 TYPHOID CARRIERS

Highest dilution in which complete or nearly complete agglutination occurred	Microscopic test with living culture	Macroscopic test with suspensions treated with	
		Alcohol	Formalin
1:160	0	0	3
1:80	2	5	1
1:40	6	0	2
1:20	0	3	1
No agglutination	1	1	2



in the study. Series of specimens from each patient are tested if they can be secured. The technic, in so far as possible, is the same in all of the cooperating laboratories. The central laboratory in Albany is furnishing the suspensions of *B. typhosus* treated with alcohol and with formalin so that identical antigens will be used. Our experience has indicated that both types of antigen remain satisfactory for at least 6 months.

The results obtained with specimens received in the Division of Laboratories and Research at Albany from January 1, 1931, to September 1, 1932, have been tabulated (see Tables I-VI). On the whole, they correspond with those reported by Felix and his coworkers. The findings indicate that agglutination in a 1:80 or higher dilution with a formalin treated antigen suggests one of 3 alternatives: that the patient has typhoid fever, has had such an infection in the past, or has received typhoid vaccine, while a similar reaction with an alcohol treated suspension usually in-

dicates that the patient has typhoid fever or an infection incited by a species of bacteria antigenically related to *B. typhosus*. Occasionally, as has been noted by Gardner and others,<sup>7</sup> granular as well as floccular agglutination is obtained with sera from some persons who have received typhoid vaccine. Our findings suggest that at times the granular form of reaction may be the stronger of the two. However, a much smaller percentage of unexplained reactions is obtained with this procedure than with the microscopic test with living culture. Also, both granular and floccular types of agglutination have very rarely been observed in high dilutions of sera other than those from typhoid fever patients.

If the results of the joint investigation in which the Laboratory Association is participating confirm our findings, a means will be available for standardizing the agglutination test for evidence of typhoid fever, by the use

TABLE IV

AGGLUTINATION REACTIONS WITH TYPHOID BACILLI OBTAINED IN 36 SPECIMENS OF SERA FROM 34 INDIVIDUALS WHO HAD PREVIOUSLY HAD ENTERIC DISEASE (NOT CARRIERS)

Highest dilution in which complete or nearly complete agglutination occurred	Microscopic test with living culture	Macroscopic test with suspensions treated with	
		Alcohol	Formalin
1:160	0	0	0
1:80	1	2	2
1:40	1	2	0
1:20	4	4	5
No agglutination	30	28	29

TABLE V

AGGLUTINATION REACTIONS WITH TYPHOID BACILLI OBTAINED IN 73 SPECIMENS OF SERA FROM 60 INDIVIDUALS WHO HAD RECEIVED TYPHOID VACCINE

Highest dilution in which complete or nearly complete agglutination occurred	Microscopic test with living culture	Macroscopic test with suspensions treated with	
		Alcohol	Formalin
1:320	0	0	1
1:160	0	6	6
1:80	7	5	11
1:40	12	8	9
1:20	12	15	9
No agglutination	42	39	37

TABLE VI

AGGLUTINATION REACTIONS WITH TYPHOID BACILLI OBTAINED IN 2,532 SERA FROM NORMAL INDIVIDUALS, FROM PATIENTS WITH INFECTIONS UNRELATED TO TYPHOID FEVER, AND FROM THOSE CONCERNING WHOM INADEQUATE INFORMATION HAS BEEN RECEIVED

Highest dilution in which complete or nearly complete agglutination occurred	Microscopic test with living culture	Macroscopic test with suspensions treated with	
		Alcohol	Formalin
1:320	1	1	1
1:160	2	1	4
1:80	16	19	6
1:40	68	114	61
1:20	206	231	153
No agglutination	2,239	2,166	2,307

of a technic which is free from the danger associated with the handling of living culture; is extremely simple to perform; is readily controlled; and which provides data of greater diagnostic significance than the usual form of microscopic test with living culture.

## REFERENCES

1. Gilbert, Ruth, and Moore, A. C. Widal technic using sterilized cultures. *J. Lab. & Clin. Med.*, 7: 547, 1922.
2. Smith, Theobald, and Reagh, A. L. The Non-identity of agglutinins acting upon the flagella and upon the body of bacteria. *J. Med. Res.*, 10:89, 1903-04.
3. Weil, E., and Felix, A. Weitere Untersuchungen über das Wesen der Fleckfieberagglutination. *Wien. klin. Wchnschr.*, 30:1509, 1917.
4. Weil, E., and Felix, A. Ueber die Doppelnatur der Rezeptoren beim Paratyphus B. *Wien. klin. Wchnschr.*, 31:986, 1918.
5. Weil, E., and Felix, A. Ueber den Doppeltypus der Rezeptoren in der Typhus-Paratyphus-Gruppe. *Ztschr. f. Immunitäts, Orig.*, 29:24, 1920.
6. Gilbert, Ruth, Coleman, M. B., and Laviano, A. B. A Study of the granular and floccular types of agglutination with *B. typhosus*. To be published in the *J. Lab. & Clin. Med.*
7. Gardner, A. D. The Small-flaking or "O" agglutination of permanent standardized "O" suspensions of *B. typhosus* by the serums of normal, inoculated and infected persons. *J. Hyg.*, 28:376, 1928-29.

## Italian Traveling Maternal and Child Health Centers

TRAVELING maternal and child health centers are now being organized in those places of Italy where no permanent centers are in existence. According to a recent circular of the Chief of the National Bureau of Maternal and Child Welfare of Italy these centers are to have as their main function the teaching to the mother of the proper care of herself and her child; treatment of illness will not be provided. The circular emphasizes the importance of inducing the mothers to attend the centers. The centers are

under the general supervision of the National Bureau of Maternal and Child Welfare and must coöperate with the local branches of the bureau. Accurate reports must be presented daily, weekly, and monthly to the provincial branch of the bureau. The centers must also report to the local branches of the bureau all cases of mothers who are in need of aid.—

*Bollettino degli Atti Ufficiali dell'Opera Nazionale per la Protezione della Maternità e dell'Infanzia*, Rome, Jan.-Feb., 1933.

# Relationship Between Health Officer and Nurse\*

## Points of View of a Health Officer

JACOB C. GEIGER, M.D.

*Director of Public Health, San Francisco, Calif.*

THE aims of the public health nurse must be identical with those of the health officer if effective work is to be done. Harvey Cushing has said, "There is only one thing that can effectively bind people, and that is a common devotion."

Very simply stated, the common devotion or basic aim of all health workers is the prevention of disease. To accomplish this object is the task of the health officer. He must assemble the necessary machinery consisting of workers, materials, knowledge, skills, and laws. To make the machinery work is administration.

In the administration of a health department the health officer's first responsibility is to define policies and formulate programs. In this he is greatly helped by his bureau chiefs on whom he relies for technical expert advice. Because they serve both in the capacity of advisers and of executives, on whom rests the responsibility of getting the job done, these first lieutenants of the health officer assume great importance in the administration of a health department. Their ideals as professional public health workers must be of the highest, their loyalty unquestioned; particularly they must

possess the ability to execute wholeheartedly policies and orders which, though they may have been instrumental in forming them, they have not themselves set. In addition they must possess training and knowledge in their own special fields and must keep in step with progress. Here, in the caliber of his chief executives, the administrator finds his strongest tool.

Important among these lieutenants of the health officer is his chief public health nurse. Where questions of public health nursing are involved the health officer naturally turns to her for aid and advice. To her he gives the responsibility of translating the policy of the department into public health nursing routines and methods which will lead to practical accomplishment. She works out the details of *how* the thing is to be done and brings back to him the report concerning *what* has been done. In matters of staff administration such as assignments, working conditions, staff education and discipline, the widest authority is usually delegated to her by the health officer. She in turn keeps him informed of developments and accomplishments and often seeks his counsel and approval. The relationship between health officer and chief nurse must be founded on mutual trust and respect and, as has been stated before, their aims in public health work must be identical.

\* Read at a Joint Session of the Health Officers and Public Health Nursing Sections of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27 1932.

To arrive at complete understanding it is necessary that there be a feeling of free communication between the administrator and his executives. The health officer, busy and hard pressed for time though he be, holds himself accessible to his chief nurse practically at all times, and she should feel that any troublesome question or any doubt about policy or even a particularly vexatious case may be brought to him for help in its solution.

The health officer likes to feel that not only the heads of staff, but all staff members, look to him for counsel in certain individual matters. Though the staff nurse is expected to take up all matters of policy and discussion of individual cases with her immediate superiors she should also always feel welcome to see the health officer when unusual and important questions concerning herself in relation to the department arise.

To attend an occasional staff nurses' meeting is a pleasant duty of the health officer. It gives him the opportunity of becoming acquainted with some of his field representatives at first hand, and serves to establish a spirit of friendliness. In large organizations particularly the personal contact of staff worker with health officer, which is only afforded by his attending staff meetings, is invaluable in maintaining a feeling of unity and solidarity within the department. Though his purpose in attending may have been to bring encouragement and perhaps the knowledge of new developments to the field nurses, he often is himself stimulated by the interested response shown by an alert and enthusiastic group of public health nurses who are eager to hear of new developments and new knowledge in the field of their endeavor, and on whose devotion to the common cause he knows he can depend.

Since public health nursing is not an isolated activity but is intimately in-

terrelated with practically every aspect of modern public health, the public health nurse is expected to understand, in addition to her nursing technics, something of the principles, procedures, and objectives of every phase of public health.

Often, indeed, it is the nursing personnel who must carry out the program of related divisions. A bureau of child hygiene or a bureau of tuberculosis control is inconceivable without the public health nurse; yet it is generally recognized that good administrative practice requires a separate nursing division in a public health organization from whose personnel assignments are made to other divisions. To keep things running smoothly a friendly and understanding spirit of coöperation and mutual esteem between the nursing staff and other department workers must prevail.

The health officer as an administrator is vitally interested in qualifications and professional standards for all health workers. It is becoming more and more generally recognized that the nurse in public health requires special training and study. There are in the United States about 16 universities or schools of recognized standing which offer courses to graduate nurses in public health nursing. We have emerged from the time when each organization had to train its own personnel, though it is still true that many of the most excellent nurses in the field today got their public health training in the school of experience. The time has pretty well arrived when no nurse should be accepted for public health assignment without practical academic training in a recognized school. To foster this movement toward better trained public health nurses is an obligation of every health administrator.

The relationship between health officer and public health nurse is one of interdependence. She is his arm which

reaches every individual in the community, even the most humble. But for her many of the most important functions of the public health movements would fail. On the other hand, the public health nurse has a right to look to him for leadership, for program, for support. Theirs is a common devotion to human welfare.

#### SUMMARY

1. The aims of the public health nurse and the health officer must be identical for good work; on the health officer rests the responsibility of setting the aims and policies of the department.

2. In planning a public health nursing program he is aided by his nursing staff, which carries to accomplishment, as far as possible, the policies and plans of the health officer.

3. The detail of public health nursing methods and routines as well as most details of staff administration are responsibilities delegated to the chief nurse.

4. The health officer should be easily accessible to the chief nurse and, when occasion warrants, to other members of the nursing staff.

5. His attendance at an occasional staff meeting is stimulating both to him and to the nurses.

6. A close feeling of understanding and mutual helpfulness must exist between the nursing division and all other branches of the health department.

7. The administrator in public health recognizes his obligation to support and further the movement to elevate the professional standards of public health nurses.

8. The relationship between health officer and public health nurse is one of interdependence.

---

## Textile Work and Normal Childbirth

TWO studies were made recently, each in a separate district of Bavaria, of the relation between textile work and normal childbirth. The studies were concerned with 3,300 women and about 7,400 pregnancies. Two-thirds of the women were selected among textile workers and one-third for the purposes of comparison from other industries. The women textile workers showed a greater frequency of abnormal births, particularly premature births; anemia, rickets, and pelvic disorders were also more frequent among them. These differences were attributed to the effects of occupation because the general circumstances of the women in the two groups of cases were very similar. Among the occupational fac-

tors in the textile industry that were considered harmful to the women, the report mentions the posture and certain movements during the work, such as bending, lifting of weights, overstretching; the general strain of the work, particularly harmful during the second half of pregnancy, and the continuation of employment almost up to the time of childbirth were other factors. It is considered that this last fact may very well produce premature birth. Therefore, the author of the report recommends that the work be discontinued not later than 4 weeks before the expected birth, and that a rest period of at least 6 weeks be given after confinement.—*Soziale Praxis*, Berlin, 52, 1932.

# Frozen Vegetables\*

ROBERT P. STRAKA AND LAWRENCE H. JAMES, F.A.P.H.A.

*Food Research Division, Bureau of Chemistry and Soils,  
U. S. Department of Agriculture, Washington, D. C.†*

IN a previous report<sup>1</sup> the writers recorded results obtained with tin containers and cardboard boxes (Peters' Type) containing frozen peas, some of which were inoculated with *Clostridium botulinum* spores. In those studies 14 tin and 9 cardboard containers were shown to have botulinus toxin after defrosting and holding at room temperature (80-90° F.) for 3½ days. No toxic materials were obtained in containers which had been immediately defrosted or in those placed in an ice box (50-60° F.) and held for 3½ days. This report deals with a similar study of hand-shelled peas which had been frozen in 16-oz. commercial glass jars.

A detailed discussion of the preparation of the raw materials, the technic of inoculation and packing, the methods of handling, freezing, transportation and storage, the laboratory examination, and the technic for the final identification of the toxin are contained in the previous report.

Each test condition included at least 16 containers. More than 320 glass containers were prepared.

Buffer suspensions of a mixture of dried spores\*\* of 4 strains of *Cl. botulinum*, 2 Type A and 2 Type B,

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

† Food Research Division Contribution No. 162.  
1. Straka, R. P., and James, Lawrence H. A. Health Aspect of Frozen Vegetables. *A.J.P.H.*, 22, 5:473-492 (May), 1932 (any reference to "previous report" refers to this publication).

\*\* The dried spores were prepared by Elizabeth W. Sumner, William Hooper Foundation for Medical Research, San Francisco, Calif.

were used in the inoculations (for details, see p. 476-477, previous report).

Each series was prepared in triplicate. The first, not inoculated, served as controls; in the second, each filled container was inoculated with less than 100 botulinus spores; and in the third with approximately 100,000,000 spores.

Although the filled, inoculated and sealed jars of peas were frozen slowly in a refrigerated room at 10° F., not one was cracked or broken.

While holding the containers at room temperature under the various test conditions, it was often found advisable to make a small opening in the metal lid as pressure developed, similar to the procedure sometimes followed with the tin containers (see previous report). The temperature in the ice box used for defrosting and holding some of the jars ranged between 50° and 60° F.

Before discussing the results in detail it should be emphasized that toxin was obtained only in the defrosted samples of peas that had been held at room temperature, and that all of these were definitely spoiled. No toxin was obtained from containers defrosted and examined immediately or from containers defrosted and held in an ordinary ice box. In these respects the results obtained with the glass jars are identical with those obtained with the tin and cardboard containers.

Seventy-two glass containers of frozen peas were examined; 24 had received no inoculation, 24 the dilute inoculum, and 24 the concentrated.

TABLE I

BOTULINUS TOXIN AND CULTURES FOUND IN THAWED PEAS PREVIOUSLY FROZEN  
IN GLASS CONTAINERS

Jars Examined		Jars Containing Toxin			Jars Containing Cultures	
Total Containers	Inoculation	Number	Per Cent	Type of Toxin	Number	Per Cent
24	None	1	4.16	Type B	8	33.3
24	Dilute	3	12.5	Type B	11*	45.8*
24	Concentrated	5	20.8	Type B	24*	100.0*

\* Presumptive. The cultures isolated from these containers have not been identified or typed, since such information would add little to the results obtained.

Each of these lots was subdivided so that samples were defrosted according to each of the 4 methods described.

During the holding and thawing period at room temperature, 9 containers which showed definite signs of spoilage, became toxic. These included 1 uninoculated control, 3 that had received a dilute inoculation, and 5 that had received a heavy inoculation. Seven other uninoculated containers yielded *Cl. botulinum* cultures. The results are summarized in Table I.

In the previous studies the results showed that the method of defrosting and holding in a thawed condition materially influences the development of the toxin. The results when the glass containers are considered from the standpoint of different methods of defrosting and storage are also interesting. The 72 containers referred to in

Table I are classified in Table II according to their treatment following defrosting. As in the tests with the tin and cardboard containers, toxin was obtained in some of the samples held at room temperature, whereas no toxin was present in those defrosted and examined immediately, or in those held in the ice box after defrosting.

The tests for total anaerobic bacteria and total anaerobic spores showed that in almost all containers the cells far outnumbered the spores. The length of the period of holding at warm temperatures after defrosting, of course, influenced these counts. Table III shows the results obtained on the uninoculated glass containers. Studies so far have not covered those blanched in brine.

Duplicate containers for each test condition have been examined. Each

TABLE II

INFLUENCE OF METHODS OF DEFROSTING AND HOLDING PEAS ON DEVELOPMENT OF TOXIN  
Toxic Containers Obtained Under Various Methods of  
Defrosting and Holding

Jars Examined		Water Bath at 110° F. Boiled in Brine. Held			
Total Containers	Inoculation	Water Bath at 110° F. Not Held	Ice Box (50°-60° F.) Held 3½ Days	Room Temperature (80°-90° F.) Held 3½ Days	Room Temperature 3 Days
24	None	0	0	0	1 (4.1%)
24	Dilute	0	0	3 (12.5%)	0
24	Concentrated	0	0	4 (16.6%)	1 (4.1%)
Totals					
72		0	0	7 (9.7%)	2 (2.7%)

TABLE III

ANAEROBIC COUNTS, pH, AND *CL. BOTULINUM* IN UNINOCULATED GLASS CONTAINERS DEFROSTED BY EACH OF FOUR METHODS

Sample No. and Method of Defrosting	Method of Preparation	pH	Bacterial Counts		<i>Cl. botulinum</i> Demonstrated	
			Anaerobes	Anaerobic Spores	Dilution	Culture Type
28 A	Wash cold	6.6	100	0	1-10*	A
28 B	water	6.7	10	10	1-10	A
31 A	Blanch hot	6.8	1,000	0	1-10*	A
31 B	water	6.8	100	0	....	..
43 A	Blanch hot water	6.7	10	0	1-10*	A
43 B	Vacuum packed	6.7	10	0	....	..
28 C	Wash cold	6.2	10,000	0	0	..
28 D	water	6.0	10,000	0	1-10*	B
31 C	Blanch hot	5.0	100,000	0	....	..
31 D	water	5.0	1,000	0	....	..
43 C	Blanch hot water	4.7	100	0	....	..
43 D	Vacuum packed	4.7	10,000	0	....	..
28 E	Wash cold	4.8	1,000	0	....	..
28 F	water	4.8	0	0	....	..
31 E	Blanch hot	4.3	0	0	....	..
31 F	water	4.4	0	0	....	..
43 E	Blanch hot water	4.3	10,000,000	0	....	..
43 F	Vacuum packed	4.2	10,000,000	0	1-10*	A
28 G	Wash cold	6.4	10	0	....	..
28 H	water	5.0	100	0	....	..
31 G	Blanch hot	5.4	100,100	0	....	..
31 H	water	5.8	1,000,000	10	?	A
43 G	Blanch hot water	6.2	1,000,000	0	....	..
43 H	Vacuum packed	6.0	10	1,000	1-100	†

\* Demonstrated in anaerobic count tubes, not spore count.

† Culture isolated was Type A, while the toxin in the container was Type B.

container number has received a letter in accordance with the method of defrosting and storage, as follows:

1. Water bath—2 hrs. (109.4° F.), A and B
2. Ice box—3½ days (50-60° F.), C and D
3. Room temperature—3½ days (80-90° F.), E and F
4. Water bath—boiled—held room temperature (3 days), G and H

As indicated in the previous report, botulinus isolations from the uninoculated containers were made from the spore count series of beef tubes, where possible, otherwise from the anaerobic count series.

Of the 24 uninoculated containers examined, cultures of *Cl. botulinum* were obtained from 8. The relation between the type of cultures present and the methods of preparation and defrost-

ing of these are shown in Table IV. Cultures were isolated from 3 in which the peas had not been blanched and from 5 in which they had been blanched.

It is significant that 7 of the 8 cultures obtained were type A, while, as given in Table I, all of the 9 containers showing toxin had Type B.

Table V shows the relation of type and strength of toxin to inoculation and methods of preparation and defrosting. It is interesting that toxic samples were obtained in peas which had been blanched in hot water as well as in those that had only been washed in cold water. The majority of the toxic containers were samples that had been stored at room temperature without cooking.



TABLE IV

TYPES OF CL. BOTULINUM CULTURES OBTAINED FROM UNINOCULATED GLASS CONTAINERS  
DEFROSTED BY VARIOUS METHODS

Sample Number	Method of Preparation	Method of Defrosting	Botulinus Cultures Isolated	
			Type	Dilution Count
28 A	Washed cold water	Water bath 110° F.	A	10*
28 B	Washed cold water	Water bath 110° F.	A	10
28 D	Washed cold water	Ice box	B	10*
31 A	Blanched hot water	Water bath 110° F.	A	10*
31 H	Blanched hot water	Boiled brine, room temperature	A	10
43 A	Blanched-vacuum packed	Water bath 110° F.	A	10*
43 F	Blanched-vacuum packed	Room temperature	A	10*
43 H	Blanched-vacuum packed	Boiled brine, room temperature	A†	100

\* These cultures obtained from a tube in the anaerobic count series, not from spore count series.

† This container also showed Type B toxin.

TABLE V

RELATION OF TYPE AND M.L.D. OF TOXINS FROM SPOILED PEAS IN GLASS CONTAINERS TO  
INOCULATION AND METHODS OF PREPARATION AND DEFROSTING

Inoculation	Sample Number	Method of Preparation	Method of Defrosting	Toxin	
				Type	M.L.D.
None	43 H	Blanched hot water	Cooked brine, room temperature	B	2
Dilute	32 E	Blanched hot water	Room temperature	B	10
Dilute	44 E	Blanched hot water	Room temperature	B	10
Dilute	44 F	Blanched hot water	Room temperature	B	1
Concentrated	30 E	Washed cold water	Room temperature	B	20
Concentrated	30 F	Washed cold water	Cooked brine, room temperature	B	2
Concentrated	33 H	Blanched hot water	Room temperature	B	5
Concentrated	45 E	Blanched hot water	Room temperature	B	3
Concentrated	45 F	Blanched hot water	Room temperature	B	3

## SUMMARY

1. Seventy-two glass containers of frozen peas, 24 uninoculated, 24 lightly inoculated, and 24 heavily inoculated, were examined.

2. No toxin developed in peas which were examined immediately after defrosting, and none developed in those defrosted and held for 3 days in the ice box.

3. Toxin was obtained from the spoiled peas in 1 of the 24 uninoculated containers, and botulinus cultures were recovered from 8.

4. The spoiled contents of 3 of the 24 lightly inoculated containers were toxic and cultures were obtained (presumptive identification) from 11.

5. The 24 heavily inoculated containers showed 5 to be toxic after spoilage and the organism was recovered (presumptive iden-

tification) from every container.

6. All the toxic containers showed Type B toxin.

7. Of the organisms recovered from uninoculated containers, 7 were Type A and 1 was Type B.

ACKNOWLEDGMENTS—The authors are greatly indebted to Drs. F. C. Blanck, K. F. Meyer, and J. R. Esty for helpful suggestions and criticisms throughout this work. The assistance of the Glass Container Association and the Hazel-Atlas Glass Company in furnishing equipment, and the generous coöperation of the Seattle Laboratory, Food and Drug Administration, and the Port of Seattle, are gratefully acknowledged.

# Analyses of Six New York Beers

Weight per cent by Volume

Sample	Total Solids Per Cent	Ash Per Cent	N. Per Cent	Protein Nx6.25 Per Cent	Alcohol at 20° Per Cent	Carbohydrate as Starch Per Cent
A Light	6.14	0.110	0.0775	0.485	3.10	5.12
B Light	6.00	0.155	0.0818	0.511	3.34	4.45
C Light	5.75	0.156	0.1060	0.655	2.86	3.56
D Dark	4.04	0.148	0.0631	0.394	3.34	3.22
E Dark	4.92	0.190	0.0872	0.545	2.78	3.78
F Dark	5.55	0.158	0.0734	0.459	3.82	4.16

## FOOD VALUE

One pint beer contains 470 c.c. liquid. One gram of protein or carbohydrate yields 4 calories. One gram alcohol if utilized for energy yields 7 calories.

One Pint	Gms. Protein	Gms. Carbohydrate	Gms. Alcohol	Alcohol Calories	Nutrient Calories	Total Calories
A Light	2.28	24.00	14.57	102	105	207
B Light	2.40	20.90	15.70	110	93	203
C Light	3.12	16.70	13.44	94	79	173
D Dark	1.83	15.15	15.70	110	68	178
E Dark	2.56	17.80	13.06	91	81	172
F Dark	2.16	19.55	17.95	126	87	213
Ave. for 3 lights	2.60	20.53	14.57	102	92	194
Ave. for 3 darks	2.19	17.50	15.57	109	78	188
Its. & darks	2.39	19.01	15.14	105	85	191

*Mineral Analysis.*—Qualitative examination showed the following elements absent, As, Cu, Al, Zn; a trace of iron Ca, Mg, K, Na, present. Also considerable  $\text{PO}_4$ .

The most common comparison concerning which we have inquiries is as to milk. Sherman gives 314 calories to the pound of milk. It will be seen by the above that 6 beers average 191 calories to the pint; that is, not quite  $\frac{2}{3}$  the value of the pint of milk so far as calories go.—Walter H. Eddy, M.D., Teachers College, Columbia University, New York, N. Y.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

CLARENCE L. SCAMMANN, M.D.

ARTHUR P. MILLER, C.E.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## A TRIUMPH FOR PUBLIC HEALTH

THE City and County of San Francisco proudly chalks up another victory for the modern concept of public health. The question of a safe milk supply has been settled by the passage of a model milk ordinance.

In 1928 the Board of Health, at that time an executive body, passed a resolution setting January, 1933, as the time when all milk coming into the City and County of San Francisco should be from tuberculin tested herds. In November, 1932, an ordinance was presented to the Health Committee of the Board of Supervisors to make this resolution effective. In addition to requiring all milk to be from tuberculin tested cattle, the ordinance required all milk which was not certified to undergo pasteurization, and further that milk used for cream separation should comply with the specifications for Grade A market milk.

Since 1912 compulsory pasteurization has been in effect for 98 per cent of the milk supply, the few exceptions being certified and guaranteed raw. Certified milk is produced under the supervision of the Milk Commission of the San Francisco County Medical Society. Guaranteed raw milk is tuberculin tested and has a bacterial count of not over 10,000 per c.c. but is not certified. In the opinion of the Director of Public Health the inspection service given this guaranteed raw was insufficient. It did not measure up to the certified standard of inspection and the guarantee was in name only.

Dealers in certified milk had reduced the price from \$.25 to \$.17 per quart, but guaranteed dealers had not followed suit and were getting more than was originally charged for certified milk. One of their principal objections to submitting to certification was the increased cost of production.

The milk supply of San Francisco comes from 340 dairies and amounts to 50,000 gallons per day. This entire supply was pasteurized with the exception

of 500 gallons certified under the Milk Commission of the County Medical Society and 455 gallons from the guaranteed raw milk dealers.

The Health Committee voted against the ordinance 2 to 1 but a minority report by the chairman of the committee brought the ordinance before the Board of Supervisors as a whole. For 20 weekly meetings, over a period of 5 months, arguments for and against were heard. Various protests and arguments were heard from the National and the California Natural Milk Producers Associations. These long-drawn-out and often inaccurate dissertations were fortified by personal accusations against the integrity of the Director of Public Health and his staff of milk inspectors. A mythical milk trust was painted as a *bête noire* threatening the future price of milk. This threat was based on the plea of one man who produced 50 gallons a day and who alleged that the elimination of his product would inevitably produce a monopoly. Women's clubs, civic organizations, the County Medical Society, and the Health Advisory Board, now an advisory committee, were all solidly behind the ordinance when finally the opponents of the measure gave up trying to wear down its sponsors and permitted a vote to be taken. The measure passed and the opponents had not gained a single vote.

On May 1 the measure passed its second reading and became effective May 15. The clause in reference to milk for cream separation has a 60-day delay before becoming operative.

San Francisco is to be congratulated on the fact that its Board of Supervisors is willing to listen to expert advice, and recommendations not based on commercial motives in passing laws which safeguard the health of the citizens and the children of San Francisco.

## DIFFERENTIATION OF HUMAN FROM BOVINE TUBERCLE BACILLI

A TIMELY warning concerning the use of the rabbit as an animal for the differentiation of the bovine and human types of the tubercle bacillus has been given by Cobbett.<sup>1</sup> It will be remembered that in Koch's memorable address at the London Congress on Tuberculosis, in 1901, he said that the proper method of differentiation was inoculation of the bovine animal, and in the first experiments, those done at the State Live Stock Sanitary Board of Pennsylvania, a grown cow and calves were used. Necessarily the expense was heavy, and it was a great relief to bacteriologists to find that the rabbit was almost as good an animal for the differentiation of these two types of organism as cattle. Since that time, the work, as far as animal inoculation goes, has been done largely with rabbits. Dr. Cobbett considers that we have assumed too much regarding the immunity of the rabbit toward the human type of the tubercle bacillus, and points out that general infections do take place, and the animals sometimes die. The immunity is therefore only relative.

He gives an interesting description of the two types of tuberculosis seen in rabbits following inoculation with the human strain of the bacillus, and ends by warning experimental workers that they must recognize " (a) an extensive mild type of tuberculous peritonitis with some degree of miliary tubercle of the lungs in rabbits which have been injected intraperitoneally with human strain, and

(b) occasionally severe progressive lesions in various organs, particularly testes and joints but sometimes also lungs." If any doubt should arise, further inoculation experiments may be necessary to arrive at a definite conclusion.

This work has raised certain interesting questions. The extensive work of Villemin in 1865 was done with tuberculous material from various sources, the bacillus not having been isolated at that time. In other words, it is almost certain that mixed cultures were used, and there are certain diseases, tetanus for example, in which often a mixed culture produces more decided effects than a pure one. However, Villemin unquestionably produced tuberculosis in rabbits by the use of human material, and decided from his experiments that tuberculosis in whatever form or in whatever animal found, was one and the same disease. In his first experiment he inoculated 9 rabbits with human material, and produced tuberculous lesions in all. Later and more extensive experiments confirmed his results, but he found that bovine material was much more virulent for rabbits than human. He even said that bovine tubercle was virulent for rabbits, human for guinea pigs.<sup>2</sup>

In 1882, Koch gave his memorable address on the etiology of tuberculosis, using pure cultures for his inoculation experiments. In Experiment 11,<sup>3</sup> he obtained generalized tuberculosis in rabbits by the injection of cultures from several sources, one obtained from human lungs, and one from spontaneous tuberculosis in a monkey, which was probably of human origin. The injections were made by several methods.

The question arises "How did these infections take place?" There can be no question that the observations were accurate. Did Villemin and Koch accidentally obtain organisms of the human type of greater virulence than usual, or had the subjects from which the material, in the one case, and the cultures in the other, were obtained been originally infected with tuberculosis of the bovine type? It is an interesting question for you to speculate upon.

#### REFERENCES

1. *J. Path. & Bact.*, 35:681-99, 1932.
2. Bulloch, W. *A System of Bacteriology*. Medical Research Council. Vol. V, p. 152.
3. Koch, Robert. *Die Aetiologie der Tuberculose*. Translation by Dr. and Mrs. Max Pinner, National Tuberculosis Association.

## CONSERVATION OF WATER

WITHOUT proof, we accept the fact that good water is essential to the individual and the community. We must have it to maintain life and habitable surroundings; therefore, it is proper that such water procurement plans as are deemed necessary should be carried through to successful conclusions. Yet, how often have municipalities been forced to go great distances at large expense for an adequate supply of good water when a much closer source would have been available if only it had been preserved and protected in such manner as to keep it suitable for consumption! Quite a number of instances of this kind can be recalled.

Misuse of a supply of good water today may mean regret tomorrow. Changing conditions sometimes bring about sudden growth in cities which forces the augmenting of the public water supply. Hence, today is the time to look ahead to

future needs. Such foresight and the good effects usually resulting therefrom will often save a good water supply which later would have to be allotted to lower uses on account of earlier misuse.

This country has been criticized as being a profligate one. In our use and misuse of our great natural resource—water—this is probably just criticism. It is strange that this is true for we have had the benefit of the experience in other countries, such as England.

Today, when the keynote is economy without sacrifice of real efficiency, it behooves us to stop and take stock of our water resources. Maryland, a state which in the past has given but little attention to the quantity of water flowing out of and over its territory, has recently created a Water Resources Commission to study the underground and surface supplies with a view to formulating plans for their preservation, allocation, control, and regulation. Other states have been working on such a program for some years but many have done nothing. In those states, now is the time to act—before denser populations with more extensive use and abuse further complicate the problems.

We must have good drinking water. Why not preserve and protect what is now available?

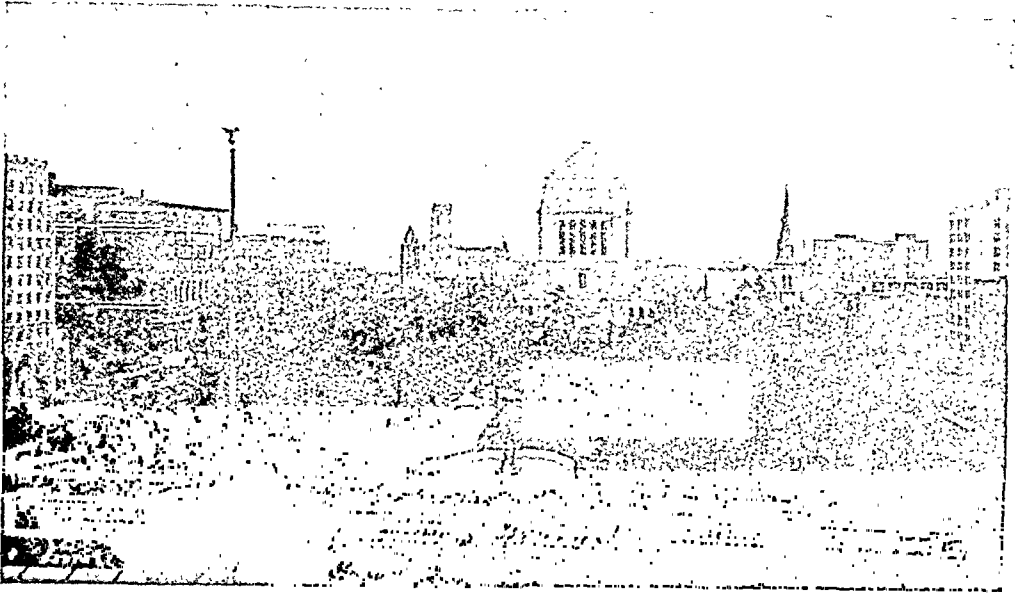
## THE WESTERN BRANCH MEETING

THE Fourth Annual Meeting of the Western Branch of the American Public Health Association was held in Pasadena, Calif., May 29, 30 and 31. It was the largest meeting held up to date, there being more than 500 registrations, and almost as many visitors in attendance. Unfortunately very few of the eastern members could be present.

The scientific program was full and well selected, more than 30 papers having been presented. A resolution was passed unanimously asking the parent society, the American Public Health Association, to meet in Southern California in a joint session in the fall of 1934. It is about time for the Association to meet in the West again and it is to be greatly hoped that this plan can be carried out.

Dr. J. L. Pomeroy, of Los Angeles, was inducted as President, and Dr. Walter H. Brown, of Palo Alto, was made President-Elect.

Sixty-second Annual Meeting of the American Public Health  
Association, Indianapolis, Ind., October 9-12, 1933,  
Headquarters, Claypool Hotel



*Indiana World War Memorial as Seen from the Top of the Federal Building  
in Indianapolis*

## ASSOCIATION NEWS

INDIANAPOLIS—OCTOBER 9-12

SOME OF THE PLACES OF SCIENTIFIC INTEREST WHICH DELEGATES  
TO THE ANNUAL MEETING WILL VISIT

THE local Committee in charge of arrangements for the Association's Sixty-second Annual Meeting is planning an extensive program of inspection trips, since there is much to interest health workers in Indianapolis.

Everyone will wish to spend some time at the Indiana University Medical Center. This occupies a 40-acre tract of land, and includes the following units: The School of Medicine, the Training School for Nurses, the Robert W. Long Hospital, the James Whitcomb Riley Hospital for Children, the William H. Coleman Hospital for Women, and the School of Dentistry, the building of which is under construction at the present time. In November, 1931, the Indiana Rotary Convalescent Home

for Children was opened and is regarded as a unit of the James Whitcomb Riley Hospital for Children. All of the above hospitals are state hospitals under the control of Indiana University.

The Indiana University School of Medicine was organized at Bloomington in 1903. In 1907 the Indiana University School of Medicine and the State College of Physicians and Surgeons united under the name of the Indiana University School of Medicine. In 1908 negotiations were completed whereby the Indiana Medical College was united with the Indiana University School of Medicine under the name of the latter and in 1909 an act was passed by the legislature authorizing the Trustees of Indiana University to

conduct a Medical School in Marion County at Indianapolis. The first year of the four years' medical course is given only at Bloomington and the last three years are given only at Indianapolis. The enrollment in the past few years has averaged approximately 100 in each class.

The Indiana University Training School for Nurses is housed in the Ball Nurses' Home. Including affiliate and post-graduate students, the enrollment is approximately 200.

The Robert W. Long Hospital, opened in 1914, is a general hospital built especially to serve patients of the rural and small town districts of the state where hospital facilities are not available. The normal capacity of the Long Hospital is 107 beds, 18 of which are in private rooms. An extensive

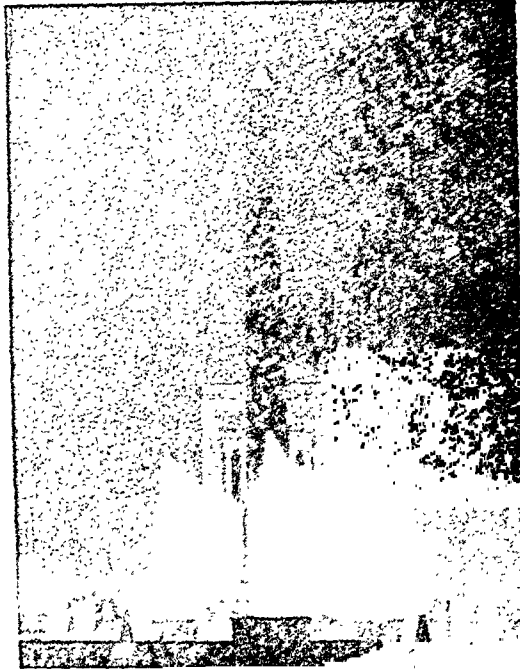
out-patient service is conducted. Private cases, full-pay ward, part-pay ward, and charity cases are accepted at the hospital. The Long Hospital is maintained by means of a state appropriation and by patients' fees.

The James Whitcomb Riley Hospital for Children, opened in 1924, accepts patients from the state whose parents are financially unable to provide for hospital care. Each child admitted to the hospital must be committed to the hospital by the Judge of the County in which the parents have established legal residence, and the cost of the care and treatment of the patient is paid by that County. The hospital

also receives a small state appropriation. An extensive out-patient service is extended to those patients not requiring hospitalization. Two major additions have been made to the Riley Hospital since its opening: In January, 1930, the Kiwanis Wing, the gift of the Kiwanis Clubs of the state, was opened to patients. This ward has a

capacity of 50 beds and is devoted to the care of orthopedic cases. In November, 1931, the Indiana Rotary Convalescent Unit, the gift of the Rotary Clubs of the state, was opened for patients. The Convalescent Unit, having a capacity of 60 beds, is located adjacent to the Riley Hospital and offers a most beneficial service to the patients of the Riley Hospital.

The William H. Coleman Hospital for Women, opened in 1927, is devoted



*Obelisk and Illuminated Fountain in the Indiana World War Memorial Plaza, Indianapolis, Ind.*

to the care of obstetrical and gynecological cases. The service of this hospital is extended to the state, and private cases, full-pay ward, part-pay ward, and charity cases are accepted. The normal capacity of the Coleman Hospital is 103 beds, which includes 35 bassinets. Twenty-seven of the adult beds are in private rooms. An out-patient department is conducted. In addition to the regular clinics, a Well-Baby Clinic is conducted. The maintenance of the Coleman Hospital is provided by a state appropriation and patients' fees.

If the cordial invitation of the Indianapolis Water Company to inspect



its various plants is accepted, delegates will see the unusual picture of a slow sand and a rapid sand filter plant handling the same raw water.

Both the main filter plant and the main pumping station of the Indianapolis Water Company are located close to the downtown section of the city and can be reached by motor within 15 minutes.

Indianapolis pioneered in the United States with filter plants. In 1904, when the slow sand filters were placed in service, filter plants had not been installed in St. Louis, Detroit, Washington, Philadelphia, Pittsburgh, and many other principal cities. Now entering the 30th year of their continuous service, all 6 units of the slow sand filter are giving very satisfactory operating results.

The rapid sand filter plant was installed in 1926. Each of the 6 units has an area of 721 square feet. Both the rapid and the slow filters handle water that has undergone preliminary treatment.

Public health engineers and members of the Laboratory section will find especially interesting:

The method of unloading, storing, and feeding of coagulants, involving the use of conductivity recording equipment.

A new plant for handling liquid chlorine in ton containers.

Equipment for applying ammonium sulfate in taste control.

Many unusual devices in the control laboratory.

The laboratory at the company's filter plant was started in 1903. At present the routine involves the handling of about 50,000 samples of water annually, ranging from the raw water through all stages of treatment to various points in the distribution system.

Since 1904, when the present system of safeguarding the city's public water supply was completed, the U. S. Public

Health Service has never failed to certify Indianapolis water.

An inspection of the sanitary district of Indianapolis will prove interesting to delegates.

The Sewage Treatment Plant was put into service in 1925. It consists of the following units or processes:

1. Grit Chambers. One main, three-channel, one two-channel and two three-channel grit chambers all fitted with bar racks and, the larger ones, with grease skimmers. They are located ahead of inverted siphons at river crossings and deliver, through conduits, to a common channel entering the clarification plant.

2. Clarification Plant. The fine screens have  $1/16"$  x  $2"$  slotted openings. Three screens operate in each channel. Sewage entering them is discharged at the end. Solids, larger than the openings, are left behind in the channel and carried out to sedimentation basins by one-third of the sewage flow, two-thirds of it having passed through the screens. The screens act as concentrators, none of the material being removed on them. The sludge from the rectangular settling basins is pumped to the digestion pits.

3. Activated Sludge Plant. The first spiral circulation in America was at Indianapolis. Since the Indianapolis plant went into service, it has been general practice to include this feature. The settlers are circular. The mechanism was designed by the engineer without the use of patented features. The plant treats about 70 per cent of the sewage flow. At the time of construction, insufficient money was available to build a larger plant. Its completion has been under consideration for some time. Unusual methods of operation have been used to relieve the river as much as possible.

4. Sludge Disposal. Both primary and activated sludge are digested in open pits about 300 feet square and 10-14 feet deep. No drying beds are provided. The wet sludge is used on market gardens, being applied in the winter so that freezing disintegrates it. The partially equipped dehydration unit was operated for six months in 1931 but is idle on account of lack of money to complete and operate it.

5. The Garbage Disposal Plant is operated by the same Board and is located adjacent to the Sewage Plant. Garbage is collected weekly in winter and bi-weekly in summer in motor drawn trailer trains and delivered to a receiving pit at the plant. Conveyors deliver it to the pressure cookers in which it is cooked

for 2.5 hours at 80 lb. pressure. The free grease is drawn off and the mass drained and dried in the cooking tank under vacuum. The finer, lighter part of the dried tankage is separated by the use of an air current and sold for feed. The residue is percolated to recover the grease, after which it is sold as fertilizer. The grease is sold for soap making and represents the most valuable part of the by-products.

Members will have the opportunity to visit the extensive laboratories of Eli Lilly and Company. The group of 25 major buildings covers several city blocks and comprises scores of departments. In addition, biological laboratories, with commodious horse stables and comfortable quarters for small animals, are maintained on a farm 20 miles east on the National Highway.

Research primarily directed to the discovery of new and better therapeutic agents or the improvement of those now

in use is conducted throughout the year at the Indianapolis laboratories of the company, and the biological plant. The personnel of the scientific division has grown, since it was first organized in 1886, until now it includes over 70 research workers trained in chemistry, biology, bacteriology, physiology, pharmacology, and experimental medicine. Approximately 40 of this corps devote their entire time to research problems. The Lilly research staff is in constant coöperation with investigators in universities, clinics, and hospitals in the United States and in many foreign countries.

The above represents only a few of the interesting possibilities in Indianapolis.

The Local Committee will have further plans to report in the next issue of this Journal.

---

#### ANNOUNCEMENT OF THE 1933

### Inter-Chamber Health Conservation Contest

**THE CHAMBER OF COMMERCE OF THE UNITED STATES** hereby announces the fifth inter-chamber health conservation contest in conformity with a resolution adopted at its 17th annual meeting.

The PURPOSE of this contest is to interest the business man in public health and thereby assist in the intelligent fostering and promotion of sound public health practices.

The ENROLLMENT procedure consists of the filling out of the attached entry blank by the secretary of the local chamber of commerce and the forwarding of it to the Insurance Department of the Chamber of Commerce of the United States at Washington, D. C.

The only REQUIREMENT for enroll-

ment is that a community's local chamber of commerce be affiliated with the National Chamber.

The FACT-FINDING SCHEDULE is the form upon which cities are graded and this is due in Washington on or before March 1, 1934.

Further data on the Contest are available either from the Insurance Department, Chamber of Commerce of the United States, Washington, D. C., or the Committee on Administrative Practice, American Public Health Association, New York City.

May 25th, 1933.

*Early Enrollment Preferably by July 1 will be to the Advantage of Your City!*

## INDIANAPOLIS HOTEL RATES

Hotel	Room Capacity	Single Room		Double Room	
		Without Bath	With Bath	Without Bath	With Bath
Antlers Hotel . . . . .	250	....	\$2.00-\$3.50	....	\$3.50-\$6.00
Brevort Hotel . . . . .	175	\$1.00-\$1.50	1.50- 2.00	\$1.75-\$2.25	2.50- 3.50
Claypool Hotel . . . . .	600	....	3.00- 5.00	....	4.50- 8.00
Denison Hotel . . . . .	200	1.25- 1.50	1.75- 3.00	2.00- 2.50	3.00- 5.00
Graylynn Hotel (apartment hotel) . . . . .	150	....	2.00	....	3.00
Hotel Eastgate . . . . .	100	1.00- 1.25	1.50- 2.00	2.00- 2.25	2.50- 3.00
Hotel Edward . . . . .	30	1.00	1.50	1.50	2.00
Hotel English . . . . .	250	1.25	1.50- 2.50	2.00	2.50- 3.50
Hotel Harrison . . . . .	...	1.50- 2.00	2.50- 3.50	2.50- 3.00	3.50- 5.00
Hotel Lincoln . . . . .	400	....	2.50- 4.00	....	4.00- 7.00
Hotel Linden . . . . .	250	1.25- 1.50	2.00- 3.00	2.00- 2.50	3.00- 4.00
Hotel Lockerbie . . . . .	200	....	2.00- 2.50	....	3.00- 4.00
Hotel Riley . . . . .	100	1.25 and up	1.75 and up	2.25 and up	2.75 and up
Hotel Severin . . . . .	400	....	2.50- 3.50	....	4.00- 7.00
Hotel Washington . . . . .	250	1.50	2.00- 4.00	....	3.50- 5.50
Hotel Williams . . . . .	150	1.00	1.50- 2.00	1.50- 2.00	2.50- 3.00
Lorraine Hotel . . . . .	100	1.25	1.50- 2.00	2.00	2.50
The Seville (apartment hotel) . . . . .	...	....	2.50	....	2.50- 5.00
Sheffield Inn . . . . .	90	1.50	2.00	2.00	3.00
Spencer House . . . . .	125	1.25	1.50	2.00	2.50
Spink Arms Hotel . . . . .	100	....	2.50	....	4.50

.....(Cut off on this line and mail to the hotel of your choice).....

HOTEL RESERVATION BLANK FOR INDIANAPOLIS MEETING  
AMERICAN PUBLIC HEALTH ASSOCIATION

450 SEVENTH AVENUE, NEW YORK, N. Y.

OCTOBER 9-12, 1933

To .....  
(Name of Hotel)

Please reserve for me .....rooms for.....persons  
for the A.P.H.A. Meeting.

Single room.....Double room.....

Maximum rate per day for room \$.....Minimum rate per day for room \$.....

I expect to arrive..... If date of arrival is changed I will notify  
you at least 24 hours in advance.

Please acknowledge this reservation.

Name .....

Street address .....

City.....State.....

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

*Health Officers Section*

- Hubert M. Heitsch, M.D., Pontiac General Hospital, Pontiac, Mich., Director of Public Health  
 George M. Little, M.D., D.P.H., Red Deer, Alta., Canada, Medical Officer of Health  
 Harry L. Richardson, B.S., Daytona Beach, Fla., Health Officer

*Laboratory Section*

- Clinton F. Brown, Chemical Laboratory, City Hall, Trenton, N. J., Assistant City Chemist

*Public Health Engineering Section*

- Charles H. Capen, Jr., 8 Florence Pl., West Orange, N. J., Sanitary Engineer, Water Filtration Plant  
 Bryant W. Richardson, 17 King St., Painesville, O., Design of Sewage Disposal Plants  
 Carl J. Scheldrup, B.A., City Hall, Albert Lea, Minn., City Health Inspector

*Child Hygiene Section*

- Garner M. Byington, M.D., W. K. Kellogg Foundation, Battle Creek, Mich., Associate Medical Director  
 Emory Morris, D.D.S., W. K. Kellogg Foundation, Battle Creek, Mich., Director, Dental Education  
 Lulu St. Clair, R.N., W. K. Kellogg Foundation, Battle Creek, Mich., Director, Health Education

*Food and Nutrition Section*

- Samuel Weiss, M.D., 57 W. 57 St., New York, N. Y. (Assoc.)

*Public Health Education Section*

- James M. Anders, 250 S. 17th St., Philadelphia, Pa., Member, Board of Health

- Etta E. Giddens, R.N., 31 Audubon Rd., Boston, Mass., with City Health Department

- Theda L. Waterman, R.N., 906 Garland St., Flint, Mich., Executive Secretary, Genesee County Tuberculosis Assn.

*Public Health Nursing Section*

- Lovina R. Chase, R.N., P. O. Box 322, Fishers Island, N. Y., Public Health Nurse  
 Violet S. Hoar, R.N., W. K. Kellogg Foundation, Battle Creek, Mich., Health Teacher  
 Florence B. Ryan, R.N., 54 E. Myrtle St., Orange, Mass., Public Health and School Nurse

*Epidemiology Section*

- Roy F. Feemster, M.D., Dr.P.H., Dept. of Public Health, State House, Boston, Mass., Assistant Director, Division of Communicable Diseases  
 Huldah E. Thelander, M.D., 822-39 Ave., San Francisco, Calif., Assistant in Communicable Disease Department, Children's Hospital

*Unaffiliated*

- James V. May, M.D., Room 109, State House, Boston, Mass., Commissioner, Mass. Dept. of Mental Diseases  
 John E. Runnells, M.D., Bonnie Burn Sanatorium, Scotch Plains, N. J., Superintendent

*Sustaining Member*

- Life and Casualty Insurance Company of Tennessee, Life and Casualty Bldg., Nashville, Tenn.

## DECEASED MEMBERS

- Leon C. Havens, M.D., Montgomery, Ala., Elected Member 1920, Fellow 1931  
 James R. McClintock, B.S., New York, N. Y., Elected Member 1919, Fellow 1922  
 Lydia Clark, Columbus, O., Elected Member 1928  
 H. L. B. Coote, M.D., Michigan City, Ind., Elected Member 1915  
 F. C. E. Mattison, M.D., Pasadena, Calif., Elected Member 1910, Fellow 1930  
 William C. Cotton, Atwater, Calif., Elected Member 1931  
 G. Webster Hallett, Osterville, Mass., Elected Member 1929  
 Dr. Ernest A. LeBien, McHenry, N. D., Elected Member 1931  
 Irving D. Williams, M.D., New York, N. Y., Elected Member 1919.

## APPLICANTS FOR FELLOWSHIP

## HEALTH OFFICERS SECTION

John W. Brown, M.D., C.P.H., Austin, Tex.  
 Joseph Howard Hickson, M.D., New Haven, Conn.  
 Arthur D. Knott, A.B., M.D., D.P.H., Parkersburg, W. Va.

## LABORATORY SECTION

Conrad Kinyoun, A.B., Savannah, Ga.  
 Walter Leroy Kulp, M.S., Ph.D., Storrs, Conn.  
 Newton W. Larkum, B.S., Ph.D., Lansing, Mich.

## VITAL STATISTICS SECTION

Lloyd Rolland Gates, M.S., D.P.H., Ann Arbor, Mich.  
 Jessamine S. Whitney, A.B., New York, N. Y.

## PUBLIC HEALTH ENGINEERING SECTION

Albert E. Berry, M.A., C.E., Ph.D., Toronto, Ont., Canada  
 William Roscoe Berry, Norfolk, Va.  
 Harold Stephens Hutton, C.E., Montclair, N. J.  
 W. Scott Johnson, A.B., M.S., Jefferson City, Mo.  
 Willis Taylor Knowlton, B.S., Los Angeles, Calif.  
 Charles Lundy Pool, S.B., Providence, R. I.  
 Frank Russell Shaw, C.E., Chicago, Ill.

## CHILD HYGIENE SECTION

Mary Ella Chayer, B.S., New York, N. Y.  
 Joseph F. Paulonis, Ph.G., M.D., Brooklyn, N. Y.

Charles Joseph Prohaska, M.D., Hartford, Conn.  
 Eldred Victor Thiehoff, M.A., M.D., Cleveland, Ohio

## FOOD AND NUTRITION SECTION

Ferd. A. Korff, B.S., Baltimore, Md.  
 Bernard Emerson Proctor, S.B., Ph.D., Cambridge, Mass.

## PUBLIC HEALTH EDUCATION

Mrs. Bertha M. Ashby, B.S., M.S.P.H., Norman, Okla.  
 George A. Dundon, B.J., Milwaukee, Wis.  
 Baxter Key Richardson, A.B., Springfield, Ill.  
 John P. Sullivan, A.M., Ph.D., Boston, Mass.  
 Carl A. Wilzbach, B.S., M.D., Cincinnati, Ohio

## PUBLIC HEALTH NURSING

Ruth P. Carroll, A.A., B.S. in Ed., R.N., Houston, Tex.  
 Netta Ford, R.N., York, Pa.

## EPIDEMIOLOGY

H. Jackson Davis, A.M., M.D., Dr.P.H., Albany, N. Y.  
 Kenneth Fuller Maxcy, B.A., M.D., Dr.P.H., Charlottesville, Va.

## UNAFFILIATED

Bertram Feuer, M.S., Ph.D., Chicago, Ill.  
 George Henry Roth, M.D., Los Angeles, Calif.  
 Nicholas Francis Williams, D.V.S., Fort Worth, Tex.

## VITAL STATISTICS INSTITUTE PROPOSED FOR 1934

THE Vital Statistics Section of the American Public Health Association, at the suggestion of the Committee on Meetings and Publications, has been studying the desirability of a Vital Statistics Institute at the annual meeting. The Section Secretary, Dr. A. W. Hedrich, has sent a list of proposed subjects to a large number of Vital Statistics Bureaus with a view to determining which were of greatest interest to the membership. The replies were thoughtful and illuminating, and

indicated a pronounced interest in the project. For various reasons it has been deemed best to hold the Institute at the 1934 annual meeting.

Meanwhile, the officers are completing plans for a successful annual meeting at Indianapolis, in preparation for which the Section Council has held two meetings thus far. An outstanding feature of this year's meeting will be a joint session with the Health Education Section on the use of vital statistics in health-education.

## FREDERIC POOLE GORHAM, 1871-1933

FREDERIC POOLE GORHAM died in the garden of his summer home at Glocester, Rhode Island, on June 4. A member of this Association since 1899 and one of its original Fellows, his passing leaves in his associates a sense of the deepest loss.

His influence, exerted unostentatiously in countless directions, has left its permanent impress upon the science of his chosen profession, Bacteriology. Identified with the inauguration of Standard Methods for Water Analysis and Shell Fish Examination, he has been associated with all of their subsequent revisions.

Forty years ago he was appointed to the Faculty of Brown University as a Zoölogist. He soon added to his duties the development of courses in Bacteriology which comprised some of the earliest formal instruction in this subject in this country. At the time of his death he was Professor of Bacteriology and head of the Department of Biology. In the opinion of his colleagues he was one of the great teachers of his generation.

As one of his former pupils, I would add a personal tribute. We were fond of "the Prof.", but, in student days, not cognizant of his effective service in our behalf. We did not then know, as we now perceive, that he was continually working upon his boys and bringing out what might be in them. There was little of "spoon-fed" pedagogy in his graduate courses. Without our knowledge, we were being taught to stand on our own feet, and only in after years has it become apparent with what friendly artistry he did that thing which it is so difficult to do for students.

His interest in his fellow men colored his every activity. Thirty-five years ago he took the first smears for the diagnosis of diphtheria in patients of the health department of his native city, Providence. Dr. Chapin has styled this

as the beginning of practical bacteriology in his department. The association of these two scientists in this work was continued until interrupted by death. For the State of Rhode Island he saved the failing shellfish industry by the planned and supervised investigations which resulted in the necessary sanitary reforms. When the milk situation in his community needed scientific attention, Gorham was prevailed upon to take over the work, and he accomplished results which won for him the praise of all concerned. Mosquito eradication he directed successfully; hospital and community welfare projects benefited by his sound judgment and advice; in a truly remarkable way he discharged the civic duties of the individual and exemplified the service of science to the community.

As would be expected of a scientist of such wide interests, Professor Gorham was a member of many learned societies, among which the Society of American Bacteriologists benefited by his services as secretary, vice-president, and president.

It is a fine thing so to have lived that even after death has come one lives on in the affection and esteem of his fellow men. Professor Gorham possessed so many admirable qualities that it is difficult to know which most to admire. Be it his genial smile, his pithy eloquence, his great adaptability, his indefatigable industry, his unfailing interest in mankind, his skill as administrator, organizer, teacher, his keen analysis of problems and equally keen formulation of methods for seeking their solution, his tremendous volume of quiet accomplishment, each and every one of these was a manifestation of his friendliness, enthusiasm, competence and integrity. What more can any man possess and share with his generation? JOHN W. M. BUNKER

## EARL MAX PICKENS

EARL MAX PICKENS, A.M., D.V.M., Fellow and Secretary, Food and Nutrition Section, American Public Health Association, succumbed to a heart attack on June 13th, 1933. Dr. Pickens was Professor of Bacteriology and Animal Pathology and Head of the Department at the University of Maryland, College Park. He was 44 years old.

He had long been active in public health work, particularly as related to

milk and animal diseases. He was known as a capable investigator, a successful teacher and one who gave much time and thought to state and national health problems. He has been honored by election to responsible offices in several scientific organizations to which he belonged.

The Association has lost an influential member and an ardent supporter. Dr. Pickens' wife and three children survive him.

## A NATION'S INVESTMENT IN HEALTH

DR. FRED O. TONNEY, of Chicago, for many years head of the research staff of Chicago and also radio advisor to the Association, is introducing on June 28 a series of radio broadcasts through the facilities of the National Farm and Home Network of the National Broadcasting Company sponsored by the American Public Health Association. The program has been arranged by a committee under

the direction of Dr. Louis I. Dublin, past president of the Association, Dr. John A. Ferrell, Dr. Haven Emerson, Dr. Kendall Emerson, and Dr. Fred O. Tonney, together with the active coöperation and help of Mr. Frank E. Mullen of the National Broadcasting Company. The speakers have been carefully selected and the program arranged is as follows:

<i>Date 1933 - Subject</i>	<i>Name</i>	<i>From</i>	<i>Time (Daylight saving)</i>
June 28 Introduction	Dr. Fred O. Tonney	Chicago	12:35 P.M. C.D.T.
July 5 Water Control	George W. Fuller	New York	1:35 P.M. E.D.T.
July 12 Protection of Milk Supplies	Dr. Chas. E. North	New York	1:35 P.M. E.D.T.
July 26 Reduction in Public Health Budgets	Dr. Kendall Emerson	New York	1:35 P.M. E.D.T.
Aug. 2 To be selected	Dr. Herman Bundesen	Chicago	12:35 P.M. C.D.T.
Aug. 9 Safeguarding Child Life	Dr. George Palmer	New York	1:35 P.M. E.D.T.
Aug. 23 Epidemiology	Dr. George B. Ramsey	New York	1:35 P.M. E.D.T.
Aug. 30 Laboratory Chats	Dr. Fred O. Tonney	Chicago	12:35 P.M. C.D.T.
Sept. 6 Tuberculosis	Dr. Lawrason Brown	New York	1:35 P.M. E.D.T.
Sept. 13 To be selected	Dr. Louis I. Dublin	New York	1:35 P.M. E.D.T.
Sept. 27 Safeguarding Infant Life	Dr. Alfred E. Hess	New York	1:35 P.M. E.D.T.
Oct. 4 Causes and Results	Prof. C.-E. A. Winslow	New York	1:35 P.M. E.D.T.

The committee wishes to take this opportunity to thank Dr. Tonney for the work he has done in arranging and handling the details of this broadcast with the Broadcasting Company and to thank Mr. Mullen for the opportunity

given us by the National Broadcasting Company to bring before the public many of the problems of public health and to present them in a scientific and authoritative manner.

# PUBLIC HEALTH ADMINISTRATION

Salem, Mass.—This city with a population of 43,353 (1930 census) reports a death rate of 10.9 for 1932. The infant mortality rate has consistently declined from 189 in 1900 to 64 in 1930 and reached a new low figure of 43 per 1,000 births in 1932. Diphtheria prevention clinics have been conducted in the schools but the Board of Health reports that diphtheria is more prevalent than it should be. There were 54 cases with but one death. The Health Department personnel includes, in addition to the Health Officer, one clerk, one physician, one dentist, one inspector of animals, two public health nurses and two sanitary inspectors.

Lynn, Mass.—This city of 102,320 individuals (1930 census) reports a death rate of 10.2 for 1930, slightly higher than that for the preceding year. The health department budget was \$51,562.00. There were reported 57 cases of diphtheria with 3 deaths.

Indiana.—The State Board of Health of Indiana, which recently celebrated its fiftieth anniversary and could boast of only 5 health commissioners during that period, has been reorganized and Dr. John H. Hare, a member of the old State Board of Health, has succeeded Dr. William F. King, as Secretary. The work of the maternal and child welfare division has been discontinued except in its strictly educational phase. Laboratory service has been transferred to the University School of Medicine. State support for venereal disease clinics has been withdrawn. The new form of organization provides for closer relation between the State Board of Health, the State Uni-

versity and the State Medical Association.—*Month. Bull.*, Indiana State Board of Health, Apr. 1933.

Venereal Disease Clinics.—The New York State Department of Health states that a community should have a clinic when such "community can care for its indigent syphilitics at less cost by providing clinic service than by paying physicians a nominal fee per visit for the medical supervision of such cases." There is need of economic consideration for the care of indigent persons afflicted with syphilis who are apparently applying for medical care in ever increasing numbers. Responsibility for treatment of such individuals rests upon the local boards of health and health officers.

The social hygiene division of the State Health Department is assisting in presenting the need for clinics to county medical societies and county boards of supervisors.—*Health News*, New York State Dept. of Health, May 15, 1933.

Knoxville, Tenn.—This city with an estimated population of 111,930 in 1932 spent \$.51 per capita for public health purposes. The per capita expenditure has shown a decrease from \$.64 in 1930. The death rate of 12.1 is the lowest on record. A very encouraging report is made of the reduction in the so-called filth-borne diseases including diarrhea and enteritis, which causes have long been prominent in the leading causes of death. Diarrhea and enteritis now stands tenth on the list and is responsible for but 2.4 per cent of all deaths. The annual health report which is multigraphed is very attractively edited and contains numerous



valuable charts, tables and diagrams. The Health Officer has well demonstrated what can be done with the limited appropriation and facilities.

**Schenectady, N. Y.**—This city reports a death rate of 10.65 for 1932. There has been a general reduction in the number of reported cases of communicable diseases with the exception of mumps, which showed some increase and whooping cough which showed a marked increase. The infant mortality rate was 80 and the birth rate 16. Two deaths were attributed to diphtheria. The annual report contains statistical tables and tabulations on inspections and services rendered in the various divisions of the Department.

**Chicago, Ill.**—In May, 1914, a comprehensive ordinance was passed creating a Board of Health of 5 members. For many years prior to 1932, according to the ruling of the State Supreme Court, Chicago had been without a legally authorized health department; one which possessed the necessary authority to enforce the health laws and protect its citizens in case of epidemic or emergency. With the advent of the new Board, there has been developed a complete reorganization of the functions and personnel of the department. With a general death rate of 9.8 a new low record has been established. This means that 953 fewer persons died in 1932 than in 1930, the year of previous lowest record. The diphtheria death rate has dropped from 6.2 in 1931 to 1.9 in 1932, a decrease of 71 per cent. During the same time

the infant mortality rate has been lowered from 56.4 to 48.8. Chicago continues its unique record for a low typhoid fever rate, that for 1932 being 0.4.

A special educational program was carried on to increase the per cent of preschool children protected against diphtheria. A publicity program included the release of nearly 2,000,000 pieces of literature dealing with diphtheria protection. Field nurses were employed to urge parents to take children to the family physician. The "Birthday File," which now contains nearly 300,000 names, was used effectively, as were the infant welfare stations and the public and parochial schools. One of the special features was a motorized diphtheria prevention clinic which travelled to various areas in the city where the per cent of protection was low.

Prior to the end of the school year in June, 25 physicians and 25 nurses were paid by the Municipal Tuberculosis Sanatorium for school health service but since that date this work has been transferred to the Department of Health and there are now 35 school health officers in the Bureau of Child Welfare. In this bureau there has been an average of 300 nurses engaged during the last 3 months of the year.

There were 565 health talks given during the year by the personnel of the Board of Health, of which 75 were devoted to diphtheria, 47 on child hygiene, 64 on dental hygiene, 16 on food control, 25 for milk control, 112 on laboratory topics and 84 on general sanitation.

# LABORATORY

## THE USE OF GLYCEROL AS A PRESERVATIVE FOR MILK SPECIMENS TO BE EXAMINED FOR HEMOLYTIC STREPTOCOCCI

RUTH GILBERT, M.D., F.A.P.H.A. (*Life Member*), and M. E. CLARK  
*Division of Laboratories and Research, New York State Department of Health,  
Albany, N. Y.*

WHEN epidemics of septic sore throat are investigated, samples of milk submitted for laboratory examination may be in transit several days. During this time, in summer particularly, saprophytic strains of bacteria may multiply so rapidly that hemolytic streptococci, if present, are difficult to isolate. The efficient preservative action of glycerol on material containing microorganisms of the enteric disease group<sup>1</sup> and on milk to be examined for *B. abortus*<sup>2</sup> suggested its use also in milk to be examined for hemolytic streptococci.

A one-third volume (approximately 30 per cent) of glycerol of tested purity was added to samples of milk which had been recently collected. The specimens were then inoculated with strains of hemolytic streptococci from cases of septic sore throat. After 7 days at room temperature or 10 days in the refrigerator, the microorganisms could be easily isolated, while they were recovered with difficulty after 24 hours at room temperature from similarly inoculated portions of the milk samples which contained no glycerol. An equal volume of glycerol—50 per cent—proved less satisfactory since, under these conditions, the colonies of strep-

tococci which developed on the plating medium were slightly fewer than those from specimens containing a 30 per cent concentration; 20 per cent of glycerol has usually sufficed to preserve the specimens for 2 days only, when they were kept at room temperature.

During the past 2 years, approximately a one-third volume of glycerol has been added to samples of milk sent to be examined for streptococci; green-producing as well as hemolytic streptococci have been easily isolated from such specimens.

A simple outfit containing a measured amount of glycerol of tested purity is used. By means of a label pasted on the container to indicate the level to which the milk should be added, a 30 per cent concentration of glycerol is secured. After collection, the specimen container should be well shaken to insure thorough mixing of the glycerol and the milk.

### REFERENCES

1. Gilbert, Ruth, Coleman, Marion B., and Zimmer, Margaret. Glycerin solution as a preservative for specimens of feces for bacteriological examination. *A.J.P.H.*, 16, 7:743 (July), 1926.
2. Gilbert, Ruth, Coleman, Marion B., and Groesbeck, W. M. A study of methods for the isolation of *Bacterium abortus*. Pamphlet entitled Undulant Fever, A.P.H.A., 1929.

## A STUDY OF THE BROM-THYMOL-BLUE REACTION IN FRESHLY DRAWN MILK\*

C. S. BRYAN

*Section of Bacteriology, Michigan Agricultural Experiment Station,  
East Lansing, Mich.*

THE use of indicators in the detection of abnormal milk began with the investigations of Van Slyke and Baker.<sup>1</sup> It was primarily their purpose to detect abnormal or altered market milk and not the detection of milk from diseased udders. The following year Baker and Breed<sup>2</sup> studied various indicators in milk for the detection of mastitis. Within the past few years Stableforth,<sup>3</sup> Rosell,<sup>4</sup> Udall and Johnson,<sup>5</sup> and Hucker<sup>6</sup> have used the brom-thymol-blue reagent in the detection of milk from udders affected with mastitis. Sharp and McInery<sup>7</sup> found the brom-thymol-blue indicator gave such a large error as to make it practically useless. Stableforth<sup>3</sup> in his studies of pH of milk samples as affected by fat content reports, stated that

From the extract, of the results given in Table II, it can be seen that, taking 3 per cent as a standard, although a variation of 0.5 per cent makes little difference, a variation of 1 per cent so alters the color as to interfere considerably with the accuracy of the test; while one of two per cent makes the test nearly valueless, because a sample might be regarded as normal, doubtful, or abnormal merely according to the percentage of fat.

"Thybromol" outfits, for the detection of milk from quarters affected with mastitis, have recently appeared on the market. These are merely convenient field apparatus using brom-thymol-blue indicator to determine the pH of freshly drawn milk. There has been

wide adoption of these outfits by large milk companies in their inspection work and also by a large number of veterinarians in private practice. The present study was made to determine the significance of unexplainable variations of this test, which had been brought to our attention.

The technic used in this work was that recommended by Udall and Johnson,<sup>5</sup> which was adopted by the commercial concerns for their "Thybromol" outfits. The tests were made on the freshly drawn milk from the individual quarters and were recorded as either positive (+), doubtful ( $\pm$ ), or negative (-). Positive reactions represent milk of pH 7.0 or alkaline, doubtful approximately pH 6.9, and negative pH 6.5. These groupings were based on the work reported by Hucker.<sup>6</sup>

### DATA AND DISCUSSION

The data present the brom-thymol-blue reactions as obtained, over a period of 5 to 6 months at monthly intervals, under three different conditions. These are: (1) The normal or physiological variation of the pH of the milk of mastitis-free animals. All of the infected animals in this herd had been slaughtered 4 years previously; (2) the constancy of positive reactions in naturally infected animals; and (3) the variation from a negative reaction of non-infected animals that are present in an infected herd.

The study of normal variation of the pH of non-infected animals was carried

\* Journal Article No. 157 (n.s.) from the Michigan Agricultural Experiment Station.

out in a disease free (mastitis, tuberculosis, and abortion) herd. Four years previously a complete cleanup was made and all infected animals were slaughtered; this was followed by disinfection and renovation of the barn. During the past 4 years there have been no udder disturbances whatsoever. Very few animals have been purchased and placed in this herd. Bacteriological examinations of the milk and physical examinations were made of the milk and udders, at several weekly intervals, before such animals were released from the quarantine barn.

The results of the brom-thymol-blue reactions of the milk from these mastitis-free animals are presented in Table I. Of the 33 lactating animals there were 7 that showed a variation in reaction of the milk during this study. The reactions of the 26 animals which gave consistently negative (—) tests are not recorded in the table. The data show that a definite and pronounced variation is obtained in the pH of freshly drawn milk from these mastitis-free animals. These positive or doubtful reactions occur sporadically and may change from quarter to quarter in the same cow, e.g., a positive or doubtful reaction may be obtained and then not recur in the same quarter or cow during the period of this study. These variations occurring from time to time in mastitis-free animals demonstrate the limitations of a diagnostic test based on the pH of freshly drawn milk.

To determine the constancy of positive reactions in the milk of infected animals several naturally infected animals were chosen. The results are given in Table II, cows A and B. It will be noted that at each examination streptococci of mastitis were cultured from all four quarters of cow A. The pH reactions showed a progressive reaction and became more positive throughout the period of this study. In only

TABLE I

BROM-THYMOL-BLUE REACTIONS OF FRESHLY DRAWN MILK FROM INDIVIDUAL QUARTERS OF COWS IN A MASTITIS-FREE HERD. THE 7 COWS INCLUDED IN THIS TABLE GAVE VARIATIONS FROM A NEGATIVE REACTION; THE 26 COWS NOT INCLUDED GAVE CONSISTENT NEGATIVE TESTS.

Cow No.	Brom-thymol-blue Reactions on Freshly Drawn Milk from the Individual Quarters				Month
	RR	RF	LF	LR	
1	±	—	—	—	Nov.
	+	+	—	—	Jan.
	+	+	—	—	Feb.
	—	±	—	—	Mar.
5	—	—	—	—	Nov.
	—	—	+	—	Jan.
	+	+	+	+	Feb.
	—	±	—	—	Mar.
8	—	—	—	—	Nov.
	±	—	—	±	Jan.
	±	—	—	±	Feb.
	—	—	—	—	Mar.
22	—	—	—	—	Nov.
	—	—	—	+	Jan.
	—	—	—	+	Feb.
	—	—	—	—	Mar.
25	—	—	—	—	Nov.
	—	—	—	—	Jan.
	+	—	—	—	Feb.
	—	—	—	—	Mar.
27	—	—	—	—	Nov.
	—	—	—	—	Jan.
	+	+	—	—	Feb.
	—	±	—	—	Mar.
31	—	—	—	—	Nov.
	—	—	—	—	Jan.
	—	—	+	—	Feb.
	—	—	—	—	Mar.

one instance did a positive reaction change to a doubtful and then back to a positive reaction. Cow B presents a slightly different picture since at no time were streptococci of mastitis isolated from her right front and left rear quarters while these streptococci were isolated from the right rear and left

TABLE II

BROM-THYMOL-BLUE REACTIONS OBTAINED IN AN INFECTED HERD. COWS A AND B WERE NATURALLY INFECTED WITH STREPTOCOCCI OF MASTITIS AND COWS C, D, AND E ARE NONINFECTED COWS IN THIS INFECTED HERD.

Cow	Brom-thymol-blue Reactions on Freshly Drawn Milk from the Individual Quarters				Month	Strepto- cocci
	No.	RR	RF	LF	LR	
A	—	±	±	—	1st	all 4 quarters
	±	±	+	±	2nd	all 4 quarters
	+	+	+	+	3rd	all 4 quarters
	+	+	+	±	4th	all 4 quarters
	+	+	+	+	5th	all 4 quarters
	+	+	+	+	6th	all 4 quarters
B	+	—	+	—	1st	in RRandLF
	+	—	+	—	2nd	in RRandLF
	±	—	—	—	3rd	in RRandLF
	+	±	+	±	4th	in RRandLF
	+	—	+	—	5th	in RRandLF
	±	—	—	—	6th	in RRandLF
C	—	—	—	—	1st	None
	—	+	+	—	2nd	None
	—	—	—	—	3rd	None
	—	+	+	—	4th	None
	—	+	+	—	5th	None
	—	—	—	—	6th	None
D	—	±	+	—	1st	None
	—	—	—	—	2nd	None
	—	—	—	—	3rd	None
	—	—	—	—	4th	None
	—	—	—	—	5th	None
	—	—	—	—	6th	None
E	±	±	+	±	1st	None
	—	—	±	—	2nd	None
	—	—	—	—	3rd	None
	—	—	—	—	4th	None
	—	—	—	—	5th	None
	—	—	—	—	6th	None

front quarters at each examination. In studying the brom-thymol-blue reactions it will be observed that in the infected right rear quarter the reaction tending to shift from a positive to a doubtful reaction and did not seem to be settled at any time. In the case of the infected left front quarter the re-

sults were very inconsistent, characterized by continually changing from positive to negative. On only two occasions did the two non-infected quarters change from a negative to a doubtful reaction.

The variation from a negative reaction of non-infected animals that were present in an infected herd proved rather striking. Such conditions are found in animals C, D, and E in Table II; these were picked at random from a large number of similar cases in two large herds. During the time these cows have been under the writer's observation no streptococci were isolated from their milk and they were furthermore devoid of any indications of mastitis. Definite positive and doubtful reactions were obtained in testing the milk of these cows; such reactions are misleading unless other tests or examinations are made to assist in making a definite diagnosis.

It is these variations of the pH of freshly drawn milk, using brom-thymol-blue indicator, that have caused concern to the veterinarian and milk inspector in detecting cases of mastitis. To insure confidence on the part of the dairyman in the veterinarian and the milk inspector it is necessary that any test used in the diagnosis of mastitis should not give wide unexplainable discrepancies or variations. Such discrepancies in diagnosis, particularly if they affect the economic condition of the dairyman will cause suspicion and immediate lack of coöperation.

According to the early workers the test is based on the fact or supposition that there is an alkaline exudation or transudation of blood or lymph constituents into the milk due to an injury. Specifically in mastitis the positive reaction is attributed to injury caused by the streptococci of mastitis. The interpretation of a positive reaction becomes less definite and more general when it is noted that apparently physiological

conditions cause a positive reaction. Frequently the abnormality of milk due to infection of mastitis can be detected upon physical examination of the milk as early as by the brom-thymol-blue reaction.

#### SUMMARY

The data presented seem to indicate that:

1. Apparently there are normal physiological factors that are responsible for a variation in the pH of freshly drawn milk.
2. The test cannot be used alone to detect cases of mastitis, since positive reactions were obtained in animals that were always free of mastitis. No definite cause is given for these positive reactions. The work of Hucker *et al.*, was confirmed, indicating that a negative brom-thymol-blue reaction does not assure freedom from mastitis.
3. The brom-thymol-blue reaction is of value as an aid in determining the relative disease or freedom from mastitis of a herd.

If a large number of positive reactions are obtained it is a good indication that something is wrong in the herd but the individual cases cannot be detected.

#### REFERENCES

1. Van Slyke, L. L., and Baker, J. C. Conditions causing variation in the reaction of freshly drawn milk. *New York State Agri. Exper. Sta. Tech. Bull.* 70, 1919.
- Baker, J. C., and Van Slyke, L. L. A method for the preliminary detection of abnormal milk. *New York State Agri. Exper. Sta. Tech. Bull.* 71, 1919.
2. Baker, J. C., and Breed, R. S. The reaction of milk in relation to the presence of blood cells and specific bacterial infections of the udder. *New York State Agri. Exper. Sta. Tech. Bull.* 80, 1920.
3. Stableforth, A. W. Studies on bovine mastitis. *J. Comp. Path. & Therap.* 43:22, 1930.
4. Rosell, J. M. Studies on contagious streptococcal mastitis. *Cornell Vet.* 21:80, 1930.
5. Udall, D. H., and Johnson, S. D. Mastitis. *Cornell Vet.* 20:198, 1930.
6. Hucker, G. J., *et al.* The incidence and detection of sub-clinical streptococcus mastitis. *New York State Agri. Exper. Sta. Tech. Bull.* 199, 1932.
7. Sharp, P. F., and McInery, T. J. The colorimetric determination of the hydrogen ion concentration of milk, whey, and cream. *J. Biol. Chem.* 70: 729, 1926.

## LETTER FROM GREAT BRITAIN

### SOLVING THE SLUM PROBLEM

As ever, housing continues to occupy a great deal of the time and attention of all concerned or interested in health matters in this country. Further legislation in regard to it is in process of finding its way through Parliament into the statute book, and from time to time the Ministry of Health issues circulars and memoranda calling upon or urging local health authorities to take action.

The question of slum clearance, always serious, of late appears to have been taken more seriously. A call for the problem to be tackled vigorously has come from many quarters, many of them of a class in which the slum has been something more than merely a platform subject, with which applause could readily be obtained, and the reputation of being a sociologist of some profundity and an authority on housing easily gained.

Since he took office, Sir E. Hilton Young, the Minister of Health, has earned the reputation of being of those not unwilling, in the political phrase, to explore all avenues to their end, to omit no stone from the process of turning and, in short, to take strong action as and when required. His most recent demonstration of this willingness has been in relation to the slum.

From his department there has come within the last few weeks a manifesto in the shape of a circular addressed to local government bodies as housing authorities, indicating the necessity for abandonment of the *festina lente* policy, and for actually making haste to solve the slum problem. Legal provisions, it is pointed out, are adequate for the purpose, and of this there is no doubt, most governments over a considerable period having taken a hand at legislating in

regard to housing, and seeking to provide local authorities with encouragement, financial and moral, to clear away the property of the slum owner, compensating him on the lowest possible scale, and erecting new and more sanitary buildings on the site.

For years the expenditure on housing has been a terrible strain upon the finances of this country, the amount contributed to housing schemes out of State funds alone between 1919 and 1931 being in the neighborhood of £98,000,000. In spite of this, one of the inducements offered to local authorities to tackle the problem of slum clearance now is that the State contribution is at present on a particularly generous scale! In addition, it is pointed out that at the moment there are other favorable considerations, among them that money is cheap and labor costs low.

Conceivably these temptations may operate to induce the authorities to redouble their efforts to set about preparing a program under which at the end of 5 years the face of the land will no longer be disfigured by slums, and the erstwhile slum dwellers will be living happily and healthily in the new and sanitary accommodation provided for them.

### GOOD HOUSES OR GOOD FOOD?

Unfortunately, so far as living happily and healthily is concerned, it appears that there is some possibility of doubt. That there might be a chance that there was a doubt that it might not be for the slum dweller transplanted to improved dwellings all that fancy painted has been suspected for some time by members of the health service and others.

At society meetings and elsewhere it has been mentioned that on new housing estates some of the people seemed not to be flourishing to the extent that had been expected, and that the children were less well nourished, perhaps, than they had been before they left the bad old homes.

To the Medical Officer of Health of Stockton-on-Tees—Dr. G. C. M. M'Gonigle—has fallen the task of showing that the suspicions entertained have been well founded, producing as evidence what has happened in an area and to a section of the population in his own town. Stockton-on-Tees, an important town in the county of Durham, is in normal times a busy manufacturing and shipbuilding center, but has suffered very badly as a result of the depression. Nevertheless, the local authority has endeavored to carry on the usual activities, particularly those concerning public health and housing.

In respect of housing quite considerable expenditure must have been incurred in clearing slums and providing alternative housing, and in 1927 particularly, one "unhealthy area" that was demolished led to the dishousing of some 710 persons. For the accommodation of these citizens a "self-contained municipal housing estate (Mount Pleasant)" was specially built in another part of the town. Watching this group closely, and the mortality and such other figures as were available regarding it, Dr. M'Gonigle found, during the 5 years succeeding its translation from bad to good housing conditions, sufficient evidence of deterioration in the state of health of the constituent members to warrant detailed investigation. This he carried out and, because he was fortunate enough to have a control population almost equal in size and living under conditions identical with those in which the transferred group existed before their removal, the results obtained have a

peculiar value, and the conclusions reached may be regarded as worthy of very real respect.

Briefly, following the closest and most careful examination of all the facts and figures available, and investigation of all the conditions and all the factors that might conceivably be concerned, the conclusion reached was that from the health point of view the transferred group was in a less satisfactory state than the group resident in the bad old slum area; that there had been definite deterioration in the health of the transferred group; and that between the two the only outstanding difference was in regard to diet.

The folks in the slums were called upon to pay less for housing and had more to spend on food; those with the fine houses had to pay for the fineness, and to do so had to go short at meal-times. In a word, they had to kill themselves in order to be able to live in dwellings guaranteed healthy, and the alternatives with which the slum dweller appears to be faced are of remaining in his slum, feeding fat, and taking a chance on its killing him; or moving into a high grade dwelling and living healthily until death from starvation supervenes.

Interesting and important as these observations and conclusions are, it is unlikely that they will affect the views of the government or lead the Minister of Health to order cancellation of the circular to which I have referred and of his instruction to the local housing authorities to prepare and submit to him within 6 months a program of the work in relation to slum clearance that they propose to complete in the ensuing 5 years.

#### VARIOUS CONFERENCES

Almost daily there arrive programs of conferences to be held during the summer months. Those most recently received include that of the National



Association for the Prevention of Tuberculosis for its nineteenth annual meeting at Cardiff on July 13, 14 and 15, and of the "Sixth English-Speaking Conference on Maternity and Child Welfare." This latter is to be held in London on July 5, 6 and 7.

The main discussion at Cardiff will be on "The Part Played in the Production of Tuberculosis respectively by (1) Infection and (2) Environmental Conditions," and will include references to special investigations carried out in special areas by the National Association, and the Welsh National Memorial Association—the body mainly concerned in dealing with tuberculosis in Wales, and as part of the proceedings there are to be addresses on its history and organization by persons intimately associated with it.

Among speakers announced to take part in the main discussion are Sir Robert Philip, the President of the Conference, to whom the National Association more or less owes its existence; Dr. Nathan Raw, a well known worker in the field of tuberculosis; Dr. W. G. Savage, Medical Officer of Health of Somerset County, Sedgwick Memorial Lecturer in 1932; Dr. Harley Williams, Medical Commissioner of the National Association; and others. Apart from the discussions, arrangements are in hand for visits and demonstrations appropriate to the work of the Conference and the association generally.

The program of the Maternity and Child Welfare Conference appears to be very full with sessions arranged by the various participating organizations on each of the three days. The President on this occasion is Sir George Newman, Chief Medical Officer, Ministry of Health, and he will deliver an

address at the opening session. The subjects to be debated on the first day are "The Scope and Advancement of Ante-Natal Care," and "The Care and Protection of Illegitimate Children in Relation to Their Future Citizenship." The speakers include Miss Lilian Barker, Governor of the Borstal Institution, and Mr. Kirkpatrick of Dr. Barnardo's Homes.

On the evening of the second day, under the Chairmanship of Dr. Eric Pritchard, whose name is well known in connection with child welfare work, there will be a debate on "The Health of the Child in Relation to Its Environment, with Special Reference to Tuberculosis and Overcrowding." On the last day a series of subjects come under discussion, among them "Ways and Means of Propaganda," and "The Diet of the Child after the Period of Milk Feeding." As usual, there will be a child welfare exhibition and a number of social events—among others a garden party at St. James' Palace—and visits to places of importance from the educational point of view.

For the special benefit of medical members also it is noted that a short post-graduate clinical course has been arranged and will be held on July 3 and 4, the two days preceding the opening of the Conference. This and the Tuberculosis Conference usually attract a considerable number of delegates. That numbers may be smaller on this occasion, however, is not improbable on account of the decision of the Minister of Health to sanction the payment of the expenses of only one delegate, instead of those of two, as formerly, out of the funds of local authorities.

CHARLES PORTER, M.D.

London

# INDUSTRIAL HYGIENE

Two Studies in the Psychological Effects of Noise—Study No. I, Psychological Experiments on the Effects of Noise, by K. G. Pollock and F. C. Bartlett, considers some preliminary experiments followed by a determination of the effects on simple motor skill and upon mental work. In regard to motor skill, persistent adverse initial effect showed no great magnitude; lack of synchronization tended to be disturbing; initial effects wore off rapidly; adaptation to noise took place rapidly. The initial effects on mental work as well as adaptation were similar to those on motor skill. Discontinuous, loud, mechanical noise was more disturbing than the continuous. A distinction appeared to exist between distraction and irritation. The latter does not necessarily mean less proficient performance. On the whole, all experiments showed that noise tends to produce slight, but readily recoverable, diminutions of efficiency. The effect may be different upon a social group than upon an individual. None of these effects related to auditory performance.

Part II, by H. C. Weston and S. Adams, considers the Effect of Noise on the Performance of Weavers. The results as a whole suggest that noise is detrimental to personal efficiency, though in the present case less than 1 per cent. However, the operations controlled entirely by the weaver occupied not over 5 minutes of the hour. The worker does not become completely adapted or acclimatized to noise even after years of work, but goes through the process of adaptation daily. With the reduction of noise, output becomes consistently more regular and less variable from hour to hour and day to day. While the available data are

insufficient to justify any but tentative conclusions, they suggest that noise is not a negligible factor in industrial efficiency, in non-auditory tasks.—*Report No. 65*, 70 pages, 1932, Medical Research Council, H. M. Stationery Office (procurable from British Library of Information, 270 Madison Ave., New York). E. R. H.

School Health Education—The development of a program of health education in the public schools of the Bellevue-Yorkville District, New York, N. Y., is interestingly described in a well printed booklet of 58 pages. A consultant worked in close coöperation with school and health officials. Officers of the Board of Education and of the Department of Health, district superintendents, principals, teachers, school doctors and nurses, parents, children, staff members, all participated in the project.

After 4 years of experimental work, the summary notes, the teachers in these schools seem to appreciate the opportunities offered by the classroom day for the practice of healthful living and endeavor to help the children use these opportunities to advantage. The school showed an increase in the correction of dental defects averaging from 20 to 30 per cent. Gains in weight were noted, and these opportunities were used to interest the child in growth and to help him to understand what the factors were in his daily living which influenced growth.

A syllabus in health education was used in answering children's questions about the "how and why" of certain desirable behaviors, rather than as subject matter merely to be learned. Despite such obstacles as indifference or

ignorance of parents, poverty, inadequacy of school facilities, ill health on the part of a teacher, lack of sympathy or skill in some teachers, all of the schools are said to give evidence of improvement in individuals and groups in:

Use of the drinking fountains and other school equipment

Cleanliness of buildings and classrooms

Personal cleanliness, choice of lunches

Care of materials

Increased responsibility for ventilation, lighting, and temperature in classrooms

Drinking milk and eating vegetables

Care of younger children in school and at home

Interest in making one's self an efficient member of society

Nina B. Lamkin and Savel Zimand, *Education for Healthful Living in the Public Schools of Bellevue-Yorkville, 1927-1931*, 1932 (55 cents postpaid).

**Treatment and Prevention of Heat Cramps**—The article contains a number of case citations on the administration of common salt to men suffering from heat cramps as well as from prolonged exposure to high temperatures. The author concludes that salt administration has a markedly beneficial effect. Five grams or one teaspoonful to the gallon seems adequate and is not unpleasant to drink.—W. E. Eaton, *U. S. Nav. Med. Bull.*, 31, 2:162-164 (Apr.), 1933.

E. R. H.

**Maternity Leave in Denmark**—The Danish Women Workers' Union, composed of about 12,000 members, recently adopted a resolution to the effect that the Government and Parliament should be urged to guarantee women workers the payment of their wages in full during a rest period of 6 weeks before and 6 weeks after confinement. At present, women workers in Denmark are entitled to 4 weeks' rest after confinement, together with an

allowance payable from public funds, on presentation of a medical certificate, requiring such a rest period.—*Indust. & Labour Inf.*, XLIV, 6:177 (Nov. 7), 1932. E. R. H.

**An Enquiry in Poland**—The Polish Ministry of Social Welfare recently appointed a special committee in each district in the country to examine labor conditions in the various occupations with reference to health and safety and to report within 6 months. The committees are composed of the head of the local health service, the factory inspector and the district doctors. When they have submitted their proposals, legislation relating to industrial hygiene and safety will be drafted.—Polish Ministry of Social Welfare, *Indust. & Labour Inf.*, XLVI, 5:123 (May 1), 1933. E. R. H.

**State Silicosis Laboratory in Mexico**—The Mexican Department of Labour has built a laboratory with microscopic and radiological apparatus for diagnosing silicosis and establishing the resulting incapacity for the purpose of evaluating compensation. The examinations are carried out by the Industrial Hygiene and Safety Section of the Department.—Mexican Department of Labour, *Indust. & Labour Inf.*, XLVI, 6:149 (May 8), 1933. E. R. H.

**Annual Report, Bureau of Occupational Diseases, Ohio Department of Health, 1932**—This typed report states that the Bureau was established December 31, 1932, to take over the functions of the former Division of Industrial Hygiene which was created in 1913 to make a state survey (reported in a special volume, 1915), and continued after 1915 with a personnel of chief, consultant, and stenographer-clerk. Its salary budget in 1931 was \$6,500, reduced to approximately \$3,250 in 1932, and to \$2,050 for 1933.

Necessarily the personnel has been cut so that at present there is a part-time consultant and part-time stenographer-clerk.

The Bureau receives and evaluates all occupational diseases reported by the physician of the State, examines the records of lead works, determines additional employments from which minors should be prohibited, makes special investigations and performs considerable consulting work as well as the promoting of educational features, but the last two have been greatly curtailed.

During the course of the year, 1,169 reports of occupational diseases were passed upon, of which 1,069 were compensable, 90 were non-compensable, and 10 were acute mishaps, classified under accidents. The gross totals for the preceding four years were 1,189 (1928), 1,412 (1929), 1,334 (1930), and 1,309 (1931). Of these, the non-compensable occupational diseases reported were, respectively, 48, 68, 59, and 77 (acute mishaps not included).

The schedule of compensable diseases in Ohio numbers 22 items, of which "dermatitis" gathers in 70 to 80 per cent of the total cases reported, with lead poisoning next in order (about 15 per cent), tenosynovitis of the wrist tendons also about 15 per cent, and the balance scattered. During the 5-year period, 1928-1932, there were no cases of the following reported: anthrax, glanders, mercury poisoning, phosphorus poisoning, carbon dioxide poisoning, manganese dioxide poisoning, and radium poisoning. None of the following exceeded 11 cases per annum during this period: benzol poisoning (and certain of its derivatives), volatile petroleum products, carbon bisulphide poisoning except 18 cases in an outbreak in 1931, wood alcohol poisoning, epithelioma, brass or zinc poisoning, potassium cyanide poisoning, and sulphur dioxide poisoning. Chrome ulcerations (nasal and skin) ran, for the

5 years: 6, 10, 20, 16, and 79, respectively. Prepatellar bursitis (first reported in 1929) ran 13, 23, 29, and 23, respectively. Compressed air illness ran 16, 62, 59, 5, and 20, respectively.

In the non-compensable group, lung dust afflictions totaled 81 for the 5-year period (anthracosis 1, pneumoconiosis 80); by the year, these were 13, 15, 12, 19, and 22, respectively. Carbon monoxide poisoning, as the result of repeated exposures, ran 2, 2, 2, 4, and 1, respectively; lacquer poisoning (n.o.s.), 3, 3, 1, 2, and 1, respectively. Among afflictions whose causative agent was not clear or definite, bronchitis and asthma registered 11, 14, 12, 10, and 4; neuritis 4, 5, 3, 2, and 3; and tuberculosis 6, 8, 9, 9, and 18.

The majority of the acute mishaps were carbon monoxide poisonings, not including domestic occurrences of the same poisoning.

During the year the consultant was engaged with 121 conferences and 321 correspondence-consultations upon occupational diseases. Some 20 field investigations were made and 16 special inquiries. To render the individual occupational disease reports fairly complete necessitated 817 follow-up form-letters and about 50 special letters of inquiry. A total of 12 days was spent in court and special hearings. The Bureau also prepared an exhibit on occupational diseases and hazards, chiefly silicosis, for the Washington meeting (October 24-27, 1932) of the American Public Health Association.

E. R. H.

**Compensation for Occupational Diseases in French West Africa**—An order issued by the Governor General of French West Africa on January 22, 1933, provides for the operation in that territory of a French Decree of December 12, 1932, which gave effect to the terms of the Convention concerning workmen's compensation for occu-

pational diseases, adopted by the International Labour Conference at its Seventh Session (1925).—West Africa, *Indust. & Labour Inf.*, XLVI, 4:87 (April 24), 1933. E. R. H.

**Safety in the Manufacture and Use of Celluloid**—Continuing its series of monographs on industrial safety, the International Labour Office has just published, under the above title, a report on safety in connection with the handling of celluloid.

The monograph was drafted by Mr. Stiller of the German Ministry of Labour.

The report begins with a general survey dealing with the distribution and economic importance of celluloid, the nature and uses of the material, the dangers involved for the workers employed and the neighborhood of undertakings, and the substitutes available. This is followed by a description of technical safety measures, for the protection both of the workers and of the neighborhood, in the manufacture of nitrocellulose, celluloid, celluloid goods, film and film bases, the preparation of cinematographic films, celluloid depots, homework, packing and transport.

The second part of the monograph gives the safety regulations in force in various countries, including Denmark, France, Germany, Great Britain, Italy, Japan, and Sweden.—International Labour Office, *Indust. & Labour Inf.*, XLVI, 6:139-40 (May 8), 1933.

E. R. H.

**Medical Certificates and Industrial Diseases**—Ever since the Act of 1906 has been in force, the workman suffering from an industrial disease has had to obtain a certificate from the certifying factory surgeon, unless the employer dispenses with it. This system is designed to prevent disputes between employer and the workman by providing for certification by an inde-

pendent doctor with special knowledge of industrial disease, a feature which would not be achieved if certifications by the workman's own medical adviser were substituted. For this, the workman pays a fee of five shillings, but the whole of the compensation is paid by the employer, whereas under the Health Insurance Act weekly contributions are paid by the workers. Home Secretary, Great Britain, *Lancet*, 5720:835 (April 15), 1933.

E. R. H.

**The Occupational Progress of Women, 1910-1930**—This detailed bulletin should be consulted further by those interested. In brief, during this period, a large increase has taken place among women usually at work and especially women in non-agricultural pursuits. At the same time, a great reduction in child labor has become evident. There has also been a decided change in the distribution of women among the various gainful pursuits. The effects of the industrial depression will be watched with interest.—Mary V. Dempsey, U. S. Women's Bureau, *Bull. No. 104*, 1933, 87 pp.

E. R. H.

**Workmen's Compensation in Pulmonary Disease**—A description of the various British Acts and Schemes covering compensation for industrial pulmonary diseases, especially silicosis and asbestosis.—Charles L. Sutherland, *J. State Med.*, 40, 12:709-16 (Dec.), 1932. E. R. H.

**Health Hazards from Specific Poisons in Industry**—Classifying the hazards under five headings—communicable diseases, atmospheric conditions, contact with materials, accidents, and absorption of specific poisons—the author comments upon the company's attitude and that of the workmen in respect to the inspection of the plant and the determination

whether poisonous materials are used. Most of the spectacular and serious occupational cases occur in plants where the workmen and executives alike are ignorant of the poisonous nature of the materials used.

In connection with silica and lead dusts, the author considers that ultra-microscopic size renders control difficult if not impossible in some cases, but points out that a common way to ascertain the presence of invisible dust in a process is to take dust accumulations from rafters, sills, etc. Expensive exhaust systems are of relatively little value if fine dust is permitted to remain on places of lodgment since vibrations and movements of materials continually stir it up. "After some spectacular case of poisoning has occurred, many people would unthinkingly advocate the prohibition of the specific, or all poisonous materials, in industry. This stand, however, seems unreasonable."—F. M. R. Bulmer, *Canad. P. H. J.*, 24, 4:155-61 (April), 1933. E. R. H.

**Dust Elimination in the Pottery Industry**—There are two generally recognized health hazards in the manufacture of pottery—lead and silica dusts. An experimental study of dust conditions was made in a plant to serve as a guide to remedial measures.

Dust particle count was determined,

using the Greenburg impinger, likewise dust weight determinations. These were made in the jigger shop (clay shop), separate finishing room, stove rooms, and kiln placing rooms.

The average dust count in the clay shop was about 150 particles per c.c., or less than half the strictest requirement of the Public Health Service, and the measures instituted again cut this figure in two. In the finishing room, dust counts of 228 particles and 5.9 mg. per cu. ft., without suction, were reduced to 129 and 1.2 respectively by the use of a new finishing bench with suction. In the kiln placing room the company in question has used kaolin instead of quartz for placing or "bedding" purposes, thus avoiding the flint dust hazard here. (Other interesting dust counts and weights are tabulated.)—Edward Schramm, *J. Am. Ceramic Soc.*, 16, 5:205-13 (May), 1933. E. R. H.

**Review of Literature Dealing with Health Hazards in Spray Painting**—This special Bulletin No. 15, 44 pages, published in 1930, should be consulted by all interested in this subject and is obtainable from the National Research Council of Canada, Ottawa, price 25 cents. It also contains a valuable bibliography of 148 references. E. R. H.

## VITAL STATISTICS

**Increase in Heart Disease**—Provisional mortality figures for 1932 show that deaths from heart disease in Wisconsin gave a death rate of 218.5 per 100,000 of population, in comparison with a rate of 202.9 for 1931. The rate is said to be the highest ever recorded by the State Health Department. A marked increase in influenza also occurred, 28.6 for 1932 in comparison with 18.7 for 1931. Tuberculosis, on the other hand, showed a decline from 48.7 in 1931 to 45.1 for 1932. The infant mortality rate was estimated provisionally at about 46 per 1,000 live births, as compared with 52.9 in 1931. The death rate from diarrhea and enteritis under 2 years of age was 6.9, the lowest ever reported. Incomplete reports of deaths amounted to 30,046 and of births, about 53,000.—*J. A. M. A.* 100:1350 (Apr. 29), 1933.

**Low Records for Contagious Diseases**—A survey of five contagious diseases in Rhode Island during the period 1928–1932 revealed that death rates for typhoid fever, diphtheria and scarlet fever were the lowest in the history of the state. The mortality rates for measles and whooping cough also declined in the 5-year period, although both diseases reached record breaking peaks of morbidity in 1932. The survey showed an average of 47 cases with 6 deaths a year for typhoid. Diphtheria declined from 641 cases in 1928 to 260 in 1932, an improvement held to be the result of state-wide immunization. Scarlet fever averaged 1,431 cases, with 14 deaths a year. For measles the average was 4,925 cases a year, with 34 deaths, and for whooping cough it was 592 cases, with 33 deaths. In 1932 there were 11,330 cases of measles and

975 of whooping cough.—*J. A. M. A.* 100:1349 (Apr. 29), 1933.

**Diphtheria Mortality in Alabama**—Figures just released by the U. S. Public Health Service reveal that the death rate from diphtheria in Alabama for the last year (1932) was the third highest of the 28 states for which provisional figures are available. The diphtheria death rate per 100,000 population in Alabama was 7.5, as compared with 3.8 for all 28 states. West Virginia and Tennessee were the 2 states having higher rates than Alabama, namely, 13.2 and 8.2 per 100,000 population, respectively. The lowest rate was in Montana and Minnesota, the rate being only 0.9 per 100,000 in each of these states.

During the past 3 years, the death rate from diphtheria for the white population of Alabama has increased steadily. In 1930 the rate was 8.7, in 1931 it was 9.0 and in 1932, it was 10.4. For the colored population the rates were 4.2, 5.2, and 2.5 for the 3 years 1930, 1931 and 1932 respectively. The increase, observed for the white population, is counterbalanced to some extent by the decrease for the colored population, so that the 1932 rate for the total population is no higher than the rate in 1931. In 1930 the rate for the total population was only 7.1.

For the 3 years, 1930–1932 the number of immunizations against diphtheria, done almost exclusively in counties with organized health departments, has doubled. There were 142,274 immunizations for this period against 74,543 during the preceding 3-year period. In the last year, the potent one-dose toxoid preparation for diphtheria has eliminated one of the practi-

cal difficulties of mass immunization, since equal or better protection is afforded by this preparation, using only one injection, than was obtained formerly by using three injections.

It must be remembered, however, that to affect the mortality from diphtheria, immunizations must be largely accomplished during the preschool period. Seventy-four per cent of the deaths from diphtheria in Alabama for the years 1930-1932 were among children under 5 years of age. It has been shown that to lower significantly the death rate from diphtheria, 30 per cent of the population of this age group must be immunized. The Census of 1930 gave Alabama 313,882 children between 1 and 5 years of age. Immunization in Alabama so far has reached only a small percentage of this group.

Analysis of diphtheria mortality figures for the counties of Alabama shows wide fluctuations. Three counties show recorded death rates in excess of 30 per 100,000; 4 show rates between 20 and 30; and 9 show rates between 10 and 20. On the other side of the picture, 11 show rates between 3 and 4 per 100,000, 4 between 2 and 3, and 12 counties show no deaths at all from diphtheria in 1932. Obviously, diphtheria presents a serious public health problem in the counties where the mortality is high.—Alabama State Dept. of Health. *Month. Stat. Bull.* (May), 1933, p. 3-4.

**Mortality in Certain States During 1932, with Comparative Data for Recent Years**—For several years the U. S. Public Health Service has secured, from state health departments, current mortality data and has published death rates from important causes from as many states as could furnish the information. The summary of these preliminary rates serves as a current index of mortality until final figures are available, and for purposes

of comparison, figures derived from the same sources in previous years are used. For the year 1932, nearly all the death rates are based on data from 28 states with an aggregate population of nearly 94 million. While the rates in this group of states may not be the same as those for the total registration area, it is highly probable that the trend in these rates will be comparable with the trend in the rates in the total registration area. In considering the trend of the rates during the last 5 years, it should be remembered that the mortality in 1928 and 1929 was increased somewhat by the influenza epidemic of the winter of 1928-1929, that 1930 was free from any wide-spread epidemic, and that such epidemics as occurred in 1931 and 1932 were distinctly minor.

The death rate from all causes in 27 states reporting was 10.8 in 1932, as compared with 11.0 and 11.2 in 1931 and 1930, respectively. Of the 27 states, 20 showed a decline in 1932 from 1931, and 3 an increase in mortality, with 4 states having the same rates in both years.

In 26 states the infant mortality in 1932 was 58 per 1,000 live births as compared with 61 and 62 for 1931 and 1930, respectively. Considering the individual states, 22 of the 26 states with data available for both years showed a decrease in 1932 as compared with 1931, with increases in the other 4 states.

In spite of the fact that 1932 represents the third year of the depression, the death rate from tuberculosis in the group of 28 states was only 60 per 100,000 as compared to 65 and 68 in 1931 and 1930, respectively. Of the 28 states, 26 showed a decline and only 2 an increase; however, in 4 states the decline was very small.

Typhoid fever continued to decline rather steadily, showing a death rate of 3.2 per 100,000 for 1932 as compared with 3.8 and 4.0 for 1931 and



1930, respectively. Only 5 states had higher typhoid rates in 1932 than in 1931. Diarrhea and enteritis likewise continued a steady decline. The deaths from this cause, of children under 2 years of age, amounted to 10.3 per 100,000 total population as compared with 14.0 and 17.9 in 1931 and 1930, respectively. Of the 27 states with available data, 26 showed decreases and only 1 showed an increase in 1932 over 1931.

Influenza, of apparently a mild form, was rather prevalent in the early spring months of 1932 and again in December, with the major portion of the mild epidemic coming in the last week of 1932 and the first week of 1933. A minor epidemic also occurred in 1931, but 1930 was free from any excess deaths from this cause. The deaths credited to influenza in 1932 amounted to 28 per 100,000 as compared with 26 and 19 in 1931 and 1930, respectively. All of these rates are distinctly lower than those for 1928 and 1929, when a more severe epidemic occurred. Mortality from pneumonia was slightly less in 1932 than in preceding years, being 77 in 1932 as compared with 82 and 83 in 1931 and 1930, respectively. For influenza and pneumonia, combined, the mortality of 105 per 100,000 recorded for 1932 was slightly lower than in 1931 (107) and slightly higher than in 1930 (102). The mortality of 1928 and 1929 was definitely higher for both causes. Of the 28 states, 20 had higher influenza rates in 1932 than in 1931, while only 8 had higher pneumonia rates in 1932.

Because of wave-like fluctuations that occur in the incidence of the communicable diseases of children, the comparison of one year with another means little as far as the real trend of the mortality from these diseases is concerned. Diphtheria, which has been declining for many years, reached a new low level of 3.8 in these 28 states

as compared with 4.0 and 4.6 in 1931 and 1930, respectively. The mortality from this much dreaded disease was lower in 1932 than the mortality from whooping cough.

The death rate from poliomyelitis (0.7) in 1932 was the same as the rate in 1929, and considerably less than in either 1931, when it was 1.9, or in 1930 when it was 1.1. In 1930 the disease was epidemic in certain states, and 1931 marked a considerable epidemic in the eastern states and particularly in New York City. Meningitis mortality was likewise low in 1932, showing only 1.3 deaths per 100,000 population.

The death rate from diabetes was greater in 1932 than in any of the previous 4 years. In 1932 the mortality rate was 21.7 as compared with 20.3 in 1931, 19.1 in 1930, 18.8 in 1929 and 19.4 in 1928. In 21 of the 28 states there was an increase in 1932 as compared with 1931; in 6 states there was a decrease; and in 1 state the same rate prevailed in both years. Cancer continued its steady increase, the rate being 101 per 100,000 in 1932 as against 97.6 in 1931, 96.5 in 1930, 95.5 in 1929 and 95.8 in 1928. In 20 of the 28 states it increased in 1932 as compared with 1931 and in 8 it decreased.

Diseases of the heart also continued to increase, the death rate for 26 states in 1932 being 219.5, as compared with 211.7 in 1931, 209.6 in 1930, 215 in 1929 and 214.6 in 1928, 20 of the 26 states with available data having higher rates in 1932 than in 1931. The death rate from nephritis was about the same in 1932 (84.4) as in 1931 (83.7) but was less than in 1930 (88.0) in the group of 27 states with available data. In 25 states with available data on cerebral hemorrhage, the rate in 1932 was very slightly above that for the last 2 preceding years. In 13 of these states there was an increase in 1932 over 1931, in 11 a decrease, and in 1

the rate was the same for both years.—*Pub. Health Rep.* 48:478-480 (May 5), 1933.

Smallpox in the United States and Canada, 1932—There has been a marked and gratifying decline in the amount of smallpox during the last 3 years. In 1930, the number of cases reported in 44 states, the District of Columbia, and 8 Canadian Provinces totaled 46,654; in 1931, they numbered 29,493; and in 1932, only 13,121. In other words, the incidence of this disease decreased about 37 per cent in 1931, and 56 per cent in 1932; since 1930, there has been a total decline of 72 per cent. No single incident would give American and Canadian public health workers greater satisfaction than to accomplish the final eradication of this unnecessary and preventable disease.

It is significant that over 90 per cent of the 12,784 cases reported in the United States in 1932 occurred in less than half of the 44 states. South Dakota, alone, reported almost 1,800 cases, equivalent to the extremely high case rate of 255 per 100,000 population. If this rate had prevailed throughout the country, there would have occurred 318,000 cases of smallpox in the United States during 1932.

The case of Vermont is unique. In this state, the fourth smallest in the Union in respect to population, there have been reported, during the last 4 years, over 900 cases of smallpox. This is particularly significant in view of the fact that Vermont is surrounded by territory which has been singularly free from this disease for at least a decade. This territory, comprised of the rest of New England, New York, and the Province of Quebec, with nearly 24 million inhabitants, reported only 345 cases of smallpox during 1932. Vermont, on the other hand, with a population of only 361,000, reported 254 cases. In

other words, in Vermont there were 70 cases of smallpox for every 100,000 inhabitants; in the neighboring territory there was only 1 case for every 100,000 persons exposed to the disease. It is significant that Vermont has no compulsory vaccination law on its statute books. It is in this and other states where the routine vaccination of children is neglected that smallpox still lingers to plague public health workers.

The disease as reported throughout the United States and Canada was generally of the mild discrete type, with an average case-fatality rate of about 3 per 1,000 cases. An outstanding exception was recorded in Vancouver, B. C. Here, and in the nearby vicinity, during the early months of 1932, there occurred 56 cases of smallpox, 29 of which were definitely identified as of the confluent, virulent type. Before the outburst was brought under control, 16 persons, after prolonged physical suffering, succumbed to the disease. Only one additional death from smallpox was registered in 8 Canadian provinces last year. Of the total of 56 cases in Vancouver, 39, or 70 per cent, had never been successfully vaccinated prior to infection. The remaining 17 had been vaccinated from 15 to 55 years previously, their immunity having diminished almost to the vanishing point during this long period. No one contracted the disease who had been vaccinated within 15 years. The outbreak was finally brought under complete control through the wholesale vaccination of the population.

This epidemic is most illuminating, for it shows what may happen to a community in which antivaccination propaganda has been rife. One can readily picture conditions in South Dakota, for example, if the same case-fatality rate had prevailed there as was recorded in Vancouver (286 deaths per 1,000 cases). In that event, there would have occurred in the state of South

Dakota, 514 deaths from smallpox during 1932, almost as many deaths as are caused there each year by cancer, and equaling the combined annual

death rate from tuberculosis, appendicitis, and puerperal causes.—*Stat. Bull. Met. Life Ins. Co.* 14:6-7 (May), 1933.

## PUBLIC HEALTH ENGINEERING

**The Corrosion of Metals by Milk**  
—In tests carried out in one of the pasteurizing plants of New York City samples of milk were taken from 13 different locations of the pasteurizing equipment and analyzed for copper content. In one of the cases strips of various metals were exposed in raw milk for different lengths of time and at controlled temperatures.

It was demonstrated rather conclusively that copper, nickel, and copper and nickel alloys when exposed to milk during pasteurization may cause an increase above 0.7 p.p.m. or a decrease below 0.3 p.p.m. in the copper content of the milk. This change was more pronounced at the higher temperatures. When milk in contact with nickel loses copper this material is precipitated out and nickel goes into solution. Nickel corroded in milk more readily in the absence of oxygen, while copper corroded more readily in its presence. High chromium nickel iron alloys, "Hyblum" (a high-aluminum nickel-aluminum alloy), chromium-plated copper, and chromium-plated nickel were very resistant to corrosion by milk and for this reason appeared to be satisfactory for dairy equipment. C. G. Fink and F. A. Rohrman, *J. Dairy Sci.*, XV, 9, 73-86 (1932). *Exper. Sta. Record*, U. S. Dept. of Agri. LXVII, 6, 735 (Dec.), 1932. From *Pub. Health Eng. Abstr.*

**Jute Causes Trouble**—Kalamazoo, Mich., recently completed a new 7,000,000 gal. distribution reservoir and 7,000

ft. of 24" pipe line to connect the old system with the reservoir. Dresser couplings were used on the pipe line, except for the joints to fittings and valves, which were caulked with jute and lead or leadite. Before attempting sterilization all surface dirt was brushed from the inside of the pipe line and reservoir. Then by using a Wallace and Tiernan portable chlorinator the main was chlorinated with a dosage of 40 p.p.m. for 8 hours. The reservoir was then thoroughly sprayed with a solution containing 40 p.p.m. chlorine. Tests for bacteriological examination indicated colon organisms in 0.1 ml. quantities. Sterilization of main and reservoir using a much higher dosage was attempted a second time but bacteriological results were again positive.

An analysis of the jute used in the joints showed positive reactions in samples of 0.05 gm. of the unbraided jute. Three types of aerobic lactose fermenters were recovered from the unbraided jute samples and from the water samples. From the observations the following conclusions seem justified: (1) new installation of water mains and reservoir presented unusual difficulties in sterilization; (2) jute was a major source of contamination of the mains; (3) sterilization of mains contaminated by jute packing is very difficult; (4) bacteriological control is necessary in the proper sterilization of water mains and water equipment. Geo. I. White, W. W. Eng., LXXXV, 24, 1420-21 (Nov. 30), 1932. From *Pub. Health Eng. Abstr.*

**Air Conditioning for Small Buildings**—In order to supply air conditioning units for small buildings, such as residences, small offices, etc., and still keep the cost of the equipment at a minimum, it has been necessary at the present time to stress cheaper methods of production, distribution and installation of such equipment. At present some attempts are being made to develop cheaper methods of air conditioning but these methods have as yet not been fully developed. The problem of cheaper production methods has been solved by the development of designs which can be produced en masse in units capable of being shipped practically in full assembly. This plan also helps to keep the installation costs at a minimum. As a result of the ability to manufacture standard air conditioning units for small buildings there has been a steady increase in the number of installations of such equipment in the past 12 months. A summary of the various standard units of each type of air conditioning equipment is presented elsewhere in this issue of the Journal along with the principal characteristics of each unit. Some operating data are also included. Anon., *Heat. & Vent.*, XXIX, 29, 10, 23-24 (Oct.), 1932. From *Pub. Health Eng. Abstr.*

**Chlorinating an Open Bathing Beach**—Lake Lynn, W. Va., is an artificial fresh-water lake formed by a hydro-electric power dam. A section containing about  $4\frac{1}{2}$  mil. gal. of water is used as a bathing place by 1,000 to 6,000 persons daily in hot weather. Draw-down of the lake about 4 ft. once a week by the power plant and refilling from the Cheat River gives a complete change of water at the beach every 2-3 weeks. In 1930, 9 out of 16, and in 1931, 5 out of 18 ten c.c. samples showed *B. coli*. About 40 gal. of a solution of HTH powder, containing about 10,000 p.p.m. of available chlor-

ine, was then sprayed on the surface of the water every morning. Gas-forming organisms were not entirely eliminated, but *B. coli* were absent in all samples. Larger chlorine dosage and chlorination of streams entering the lake at the beach are planned. L. M. Board, *Munic. San.*, III, 194, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 5, 156 (May), 1933.

**Comparison of Results with Standard Lactose, Brilliant Green Bile, and Dominick-Lauter Broths**—The results of experiments on the isolation of *B. coli* in raw, filtered, and chlorinated water using standard lactose broth, brilliant green bile broth (2 per cent bile and 1:75,000 brilliant green) and Dominick-Lauter broth are tabulated and compared. All tubes were incubated for 48 hrs. and positive fermenters examined at the end of 24 and 48 hrs. The presumptive tubes were examined according to standard methods, and also all positive lactose broth and Dominick-Lauter broth tubes were planted direct into brilliant green bile broth, and positive brilliant green bile broth tubes into lactose broth. The total percentage confirmed in lactose broth and brilliant green bile was 28.6 and in Dominick-Lauter 28.3. Of the presumptive lactose broth and Dominick-Lauter tubes planted direct into brilliant green bile broth 86.6 and 99.2 per cent confirmed as against 79.3 and 98.3 per cent, according to standard methods, while of the brilliant green bile presumptives planted direct into lactose broth 97.2 per cent were confirmed, as against 93.7 by standard methods. In raw water brilliant green bile gave 1.4 per cent and Dominick-Lauter broth 0.7 per cent more confirmed results (standard methods) than lactose broth. In filtered water, however, lactose broth gave 37 per cent confirmed while brilliant green bile and Dominick-Lauter each gave 34.6. In

chlorinated water, three 24-hour and twenty-six 48-hour tubes fermented, of which only one or 3.4 per cent confirmed with lactose broth; brilliant green bile and Dominick-Lauter broth each produced one presumptive in 24 hrs. and one in 48 hrs., of which one or 50. per cent confirmed in each medium. The direct planting method takes less time and gives greater recovery of *B. coli* than confirmation by standard methods. The Dominick-Lauter medium showed a very high recovery, occasionally reaching 100 per cent, but is more difficult to prepare than lactose broth or brilliant green bile, and the examination takes longer. N. J. Howard, *J. Am. W. W. Assn.*, 24, 1305, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 5, 161 (May), 1933.

**Industrial Wastes Which May or May Not Enter Sewers**—In discussing the admission of industrial wastes into sewers, the author divides the wastes into 4 classes: (1) those admissible to sewers without previous treatment; (2) those admissible after flow adjustment; (3) those admissible after preliminary treatment; and (4) those to be excluded. Examples are given of types of wastes belonging to each of these classes and arrangements possible between sewage works and industries are discussed. H. M. Freeburn, *Munic. San.*, 3, 284, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 5 (May), 1933.

**Operating Costs of Sewage Treatment in North Carolina**—Gastonia, N. C., which treats more than 1 mil. gal. per day of sewage in an activated

sludge plant, using 2.03 cu. ft. of air per gal. of sewage and 7.5 lb. ferric chloride per 1,000 gal. of sludge, and Oliver vacuum filters for sludge dewatering, operates at a cost of \$54.33 per mil. gal. of sewage. High Point, N. C., has a similar plant the operating costs of which are \$42.78 per mil. gal. Two activated sludge plants, located at Charlotte, N. C., which treat over 6 mil. gal. per day, including wastes from dyeing and textile plants, cost \$23 per mil. gal. to operate. Oliver filters are used in one plant for sludge dewatering and the other has separate sludge digestion. *Pub. Works*, 63, 49, 1932; *Sewage Works J.*, 4, 585, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 5 (May), 1933.

**Interceptor and Sewage Disposal Works at Fort William, Ont.**—An illustrated account of the new sewers and sewage treatment plant installed at Fort William, Ontario, to eliminate the pollution of Neebing River by raw sewage. An intercepting sewer was constructed carrying 3 times the dry weather flow to a disposal plant providing for sedimentation in tanks with double spiral scrapers, sludge digestion, sludge storage during winter and drying on open beds. The plant effluent will be discharged into the lower reaches of the river, the digestion tanks heated to 80° F., the digesting sludge maintained at pH 7.2–7.5, the sludge gas collected and burned and the dried sludge used as fill and fertilizer. R. O. W. Roberts, *Canad. Eng.*, LXIII, 24, 17, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 5, (May), 1933.

## FOOD AND NUTRITION

**Effects of Freezing on the Spores and Toxin of *Clostridium Botulinum***—The production and marketing of frozen vegetables and fruits without heat sterilization has raised the question as to whether or not there is a possibility of botulinus poisoning arising from the consumption of such products which had been improperly handled. A series of experiments were conducted to study the effect of "quick" and "slow" freezing upon the viability of *Cl. botulinum* spores and the potency of botulinus toxin. Freezing the spores with solid carbon dioxide ice was resorted to for "quick" freezing while exposure in a cold room at a temperature between 18° and 20° F. was used for the "slow" freezing process. In studying the effect of freezing upon *Cl. botulinum* spores the conditions of experimentation resembled those existing in commercial practice. Dried *Cl. botulinum* spores (Type B) suspended and heated in a Sörenson buffer solution of pH 6.9 and in pea juice pH 7.1 were frozen with solid carbon dioxide ice, defrosted at intervals, and the total number of viable spores as well as the presence of toxin determined. There was no reduction in the number of viable spores, neither when defrosted and examined immediately after being frozen nor when they had been frozen for 9 days and then examined. Subcutaneous injections into guinea pigs of portions of centrifugated suspensions after freezing show that no toxin had been liberated by the spores by freezing. A suspension of dried spores of the same botulinus culture was divided among several test tubes and frozen by exposure in a refrigerated room at approximately 20° F. Twenty-four to 36 hours were

required for the suspensions to be thoroughly solidified. Examination of portions one day after being frozen and periodically to 11 weeks showed that there was neither a reduction in the total numbers of living spores, nor was toxin liberated. Botulinus toxin frozen and defrosted 15 times was not reduced in strength.—Lawrence H. James, *J. Infect. Dis.*, 52:236 (Mar.-Apr.), 1933.

**The Germicidal Efficiency of Sodium Hydroxide**—This work was prompted by the need for an efficient, odorless, and relatively non-poisonous disinfectant sufficiently cheap to warrant its routine use in milk houses, dairy barns, swine barns, and other farm buildings. Preliminary studies on sodium hydroxide indicated a satisfactory germicidal efficiency against non-sporulating organisms. The author has given a comprehensive review of the literature and presents details of his experimental work upon the germicidal efficiency, the effect of the presence of organic matter on germicidal efficiency, the effect of temperature variation, and the factors responsible for destruction of microorganisms by sodium hydroxide. High test commercial lye was found a satisfactory source of sodium hydroxide in addition to being cheap and readily available. The Reddish technic for testing germicidal efficiency was used throughout the experiment, the test organisms being *Brucella abortus* of both bovine and porcine origin and *Escherichia coli*. Tests were also made under field conditions for which a definite technic was worked out. The author concludes that sodium hydroxide in the form of high-test commercial lye appears to satisfy the need for a disinfectant suitable for use in barns and

stables and that it is inexpensive, odorless, and very efficient against *Brucella abortus* and related microorganisms. The velocity of disinfection with sodium hydroxide between 25° C. and 2° C. is independent of temperature changes. This phenomenon appears to be correlated with the peculiar physico-chemical reaction of sodium hydroxide solutions to temperature changes, wherein the ratio of hydroxyl-ion activity to the hydrogen-ion activity increases with a decrease in temperature.

At a given temperature, a given hydroxyl-ion concentration possesses a germicidal activity which is independent of the amount of alkali used to attain the hydroxyl-ion concentration. The author concludes, therefore, that the activity of the hydroxyl-ions is the most important factor in the destruction of microorganisms by sodium hydroxide.—Ernest C. McCulloch, *J. Bact.*, 25:469 (May), 1933.

**The Action of Hexylresorcinol on Bacteria in Certain Food Products**—The authors have studied the action of hexylresorcinol on bacteria in certain food products with the view that it might be used as an efficient food preservative. The work of previous investigators had shown it to be harmless to man and to possess a high phenol coefficient, properties desirable in a food preservative.

Milk, ground meat, tomatoes, and eggs were chosen as representative foods to be tested with hexylresorcinol. Equal weights of raw test foods were placed in sterile flasks and varying amounts of hexylresorcinol of known concentration added. Six concentrations of hexylresorcinol ranging from 1:100 to 1:10,000, together with control flasks without the added preservative, were employed with each food. The preservative action was checked in each product by making bacterial counts of the controls and of the sam-

ples containing preservative at stated intervals. The results obtained indicate that hexylresorcinol has little preservative action in the protein foods, that is, milk, ground meat, and eggs, only the highest concentration (1:100 dilution) exhibiting any appreciable effect. However, in the acid food tested, tomatoes, hexylresorcinol in dilutions as high as 1:5,000 causes a marked reduction in the bacterial content.—Charles F. Poe and Hazel A. Fehlmann, *J. Bact.*, 25:521 (May), 1933.

#### Microbiology of Frozen Foods.

##### IV. Longevity of Certain Pathogenic Bacteria in Frozen Cherries and in Frozen Cherry Juice

—Recognizing that the use of a sewage-polluted water supply or the employment of a typhoid carrier might result in dangerous contamination of foods to be preserved by freezing, experiments were conducted to ascertain the longevity of *Eberthella typhi*, *Salmonella schottmülleri*, *Salmonella aertrycke*, *Bacterium coli* and *Proteus vulgaris* in frozen red sour cherries and frozen cherry juice. Cherries inoculated with the test organisms were packed under 26 in. of vacuum and stored at 0° F. and —40° F. Bacteriological examinations made at regular intervals showed that at 0° F. *B. coli* and *S. aertrycke* survived 12 weeks, *Proteus vulgaris* 14 weeks, *S. schottmülleri* 16 weeks and *E. typhi* 18 weeks. At —40° F. *S. schottmülleri* survived 8 weeks, whereas the remaining four organisms used remained viable for 10 weeks. Sterile cherry juice in ampoules was inoculated with the organism named stored in frozen condition. Several such experiments were conducted. The results of one experiment reported show that *E. typhi* could not be recovered from the frozen juice in the second week, *Proteus vulgaris*, *S. aertrycke*, and *S. schottmülleri* were not viable the third week of storage, and *B. coli* was

not present in viable form the fourth week. The results of these experiments indicate that bacteria of the colontyphoid group might be expected to survive in frozen cherries after two months.—G. I. Wallace and S. E. Park, *J. Infect. Dis.*, 52:146 (Mar.-Apr.), 1933.

#### Microbiology of Frozen Foods.

*V. The Behavior of Clostridium Botulinum in Frozen Fruits and in Vegetables*—In view of the fact that no steps are taken to destroy *Cl. botulinum* in the commercial methods of preparation of frozen foods and the possibility of careless handling by consumers unfamiliar with these products, an investigation was undertaken to determine whether or not botulism could occur through the agency of frozen foods. Experiments were conducted to determine the effect of freezing on botulinus toxin as well as on atoxic spores of *Cl. botulinum* in various foods. The foods used were cherries, strawberries, black raspberries, peas, green beans, and carrots. A series of 24 glass containers were packed with each food and subdivisions inoculated with mass cultures of toxic and heat detoxified strains of *Cl. botulinum* types A and B. The containers were stored at  $-16^{\circ}$  C. Samples were examined at intervals of two weeks, two, three, six, nine, and twelve months. Samples were thawed at room temperature. The samples inoculated with toxic cultures were fed only once after thawing. The samples inoculated with atoxic cultures were fed to guinea pigs immediately after thawing, and three, six, and ten days after thawing. It was demonstrated that the toxin and spores of *Cl. botulinum* types A and B were not destroyed after being frozen and held one year at  $-16^{\circ}$  C. Although in many instances toxin production was not demonstrated after thawing at room temperature, anaerobic bacterial growth

was observed in practically all containers held at room temperature. In 4 per cent of the samples fed to guinea pigs after thawing, toxic symptoms did not develop before the fifth day after feeding and usually not until the third week after feeding. It was further observed that potent toxin was present in 4 out of 72 feedings of material taken immediately after thawing from samples originally inoculated with atoxic cultures. In 2 and possibly 3 cases toxin production occurred in such acid fruits as strawberries and black raspberries. Strict anaerobic conditions, however, were not maintained during the time after thawing that feeding tests were made. This may explain why toxin was not found in all cases. It is suggested that toxin might have been liberated during storage as a result of the physical rupture of the spores due to freezing. An experiment was conducted to observe the influence of other organisms on toxin production by *Cl. botulinum*. Types A and B were grown in cherry juice and acidified dextrose broth (pH 4.0) with *L. acidophilus* alone or in combination with this organism and *S. ellipsoideus*. Ninety-six cultures were inoculated, held at room temperature for 5 days and 1 c.c. amounts of culture fed to guinea pigs. Toxin formation was observed in 5 cases: three from dextrose broth inoculated with *Cl. botulinum* A (668) + *S. ellipsoideus*, one from cherry juice, and one from dextrose broth inoculated with *Cl. botulinum* B (437) + *S. ellipsoideus*. *Cl. botulinum* A (637) and Type B (443) did not produce toxin. An experiment was conducted to determine whether freezing would rupture *Cl. botulinum* spores and thereby liberate potent toxin. Washed spore suspensions in sealed sterile ampoules were held at  $-16^{\circ}$  C. and at  $-79^{\circ}$  C. The ampoules were alternately frozen and thawed daily for 4 weeks. Each week 1 c.c. amounts were fed to guinea pigs



to determine the presence of toxin. While in several instances evidence of the presence of toxin was obtained from ampoules held at each temperature, no conclusive proof was obtained that toxin was liberated from the spores of *Cl. botulinum* by freezing. Experiments were conducted to observe whether *Cl. botulinum* could produce toxin in the time elapsing between the canning and the freezing of foods. Non-acid type vegetables and cherries were used for canning and inoculation with detoxified strains of *Cl. botulinum* types A and B. After standing at room temperature for 4, 8, 12, and 24 hours, samples were frozen at  $-16^{\circ}$  C. Bacterial growth was observed after 8 hours. Three days after freezing feedings of 1 c.c. of the material failed to produce symptoms of botulism. Subsequent feedings after longer storage periods gave identical results. It was

concluded from these observations that there is little danger of toxin formation in foods before they are frozen and that frozen foods which are eaten promptly after thawing are probably safe. The point was stressed, however, that some growth of *Cl. botulinum* might occur if foods are not frozen soon after canning. The conclusions were that there is very little danger of botulism from frozen foods that are canned properly and used immediately after defrosting. The spores of *Cl. botulinum* are resistant to freezing and once in frozen food may remain there for long periods of time. If foods containing these spores are allowed to thaw and stand at room temperature for several days before using, they may become very dangerous. This is especially true of frozen vegetables.—G. I. Wallace and S. E. Park, *J. Infect. Dis.*, 52:150 (Mar.-Apr.), 1933.

# CHILD HYGIENE

## THE EFFECTS OF UNEMPLOYMENT ON CHILDREN AND YOUNG PEOPLE IN GERMANY

RICHARD A. BOLT, M.D., DR.P.H.

*Deutsche Institut für Ausländer an der Universität, Berlin, Germany*

THE effects of unemployment on children in the United States have been pointed out from time to time in these columns and elsewhere. We now have available the first of a series of inquiries into the effects of unemployment on children in several other countries.<sup>1</sup> In view of the present situation in Germany it is enlightening to review the report on child welfare from that country. It is planned to set forth in following issues of the *Journal* reports of conditions as found in the other countries of Europe.

There are approximately 6 million registered unemployed in Germany today and it is estimated that there are between 1 and 2 million "invisibles," or unemployed who are not registered.

The recovery of the labor market (on which wilfully erroneous information has too frequently been published) has not led to any reemployment of idle hands, but has in many cases tended only to the lengthening of the daily working hours of those still in jobs. . . . In December, 1932, the German National Statistical Office published interesting figures concerning average salaries, and from these we learn that the average wage fixed by collective contract fell, between 1929 and 1932, by 19 to 20 per cent. In 1929, 38 per cent of workers earned more than 36 marks a week; in 1932, the percentage was only 19.9.

On the other hand, the number of workers who earned up to 24 marks a week rose from 45 per cent in 1929 to 60.9 per cent in 1932.

We quote these figures because they show that unemployment, which has become practically permanent in Germany, has brought about a serious lowering of the average standard of living among the population still at work. Moreover the falling off in the consumption of milk, butter, eggs, meat, wheat, flour, and other farm produce, has also aggravated the agricultural crisis.

If we compare the curves of infant mortality in the differing age groups during the past 10 years, with a view to ascertaining the present health conditions of the German child, we arrive at conclusions that do not appear to substantiate the actual degree of economic poverty of large classes of the population, nor the dangers to which the child is exposed. The proper course is to take note of evils when they appear, and before their full effects are apparent in mortality statistics.

In recent years a number of careful scientific studies made among the stricken population showed that, until a short time ago, it was very difficult to prove by accurate statistics that the health of the people in general suffered seriously through unemployment and poverty, but that, nevertheless, no conscientious observer could fail to acknowledge the present needs of individuals or of particular groups. *In times of need, children are always in danger, since any serious fluctuations in the physical, intellectual and moral care they need are a grave obstacle to their normal development.*

With this in view the German Central Union of Private Child Welfare organizations sent out a questionnaire to a considerable number of school physicians, poor law doctors, hospital physicians, family physicians, pediatricians, and directors of municipal Public

1. Welland, Ruth. The Effects of Unemployment on Children and Young People in Germany, in *Children, Young People and Unemployment*, Part I, Germany, pp. 14-53, U. S., Belgium and Switzerland. Published by The Save the Children International Union, 15 Rue Lévrier, Geneva, Switzerland, 1933. The International Save the Children Fund of America, 159 5th Ave., New York. Price 35 cents.

Health Offices requesting carefully considered answers to the following:

1. Have you observed an increase of morbidity among the children of the unemployed, as compared with the children of the families in better conditions?

2. Have you observed an increase in rickets among the children brought for the first time to the child welfare clinics or out-patient departments?

3. Have you observed an increase in illnesses caused by cold, and do you think this is due to inadequate clothing or bad shoes as an effect of the unemployment, and the resulting poverty of the family?

4. Have you observed among the children of the unemployed an increase of illness due to lack of cleanliness?

5. Has reduced living and sleeping accommodation among the unemployed diminished the physical resistance of the children (tiredness, lack of enthusiasm for games, reduced power of concentration, etc.)?

6. Have you observed undernourishment, or bad consequences of irregular and faulty feeding, due to poverty rather than to bad housekeeping?

Answers were received from 29 doctors and 3 municipal health officers in 22 towns and districts. Very suggestive information supplementing the medical reports was received from teachers in kindergartens, day-homes, elementary schools and others dealing with the care of children and young people. Social workers and members of private relief organizations also contributed to the value of this study, as the information in most instances was supplied without solicitation.

At the outset two difficulties were met which were impossible to evaluate when any comparison was attempted between the health conditions of children in working and non-working families. In the first place there exist very few statistics on the physical and health condition of these two classes considered separately, and, in the second place:

... the apparent standard of living in an unemployed family is not necessarily lower than that of a family where the bread-winner

is still at work. Duration of unemployment very largely influences the economic situation of the family.

Unemployment has a direct and indirect effect on child health. The longer it continues, the more children suffer from increasing economic stress. At the outset, the unemployed cut out the greater part, or even the whole, of their expenditure on bodily and intellectual comfort. Very often they move to smaller quarters, a step that in itself has usually a bad effect on the child. No new clothes or underclothing can be bought; and later on the quality, and finally the quantity, of the food is diminished. Careful observations made by physicians in many cases of underfeeding and its fatal consequences show that the unemployed parents have exhausted all possible resources and that acute poverty has set in.

But the children of families still in work are already indirectly, yet gravely, affected by prevailing unemployment. The financial situation of municipal and provincial administrations has, during the last year, become really critical. This is due not only to the large increase in the cost of maintaining the assisted unemployed, but also to the vanishing revenue. On November 1, 1932, 1,849,768 unemployed were supported by the Reich, and 2,046,537 by municipalities and districts. Even were the numbers of the unemployed in Germany to remain stationary, no immediate improvement in the financial situation of the municipalities could be expected, as taxes continue to bring in less and less; some of these taxes produce no revenue whatever, or at best half. In order to guarantee to the assisted unemployed the minimum allocation, in quite a number of municipalities and country districts it was necessary to reduce or cut out entirely all votes for preventive health and child welfare work.

In a study of 43 cities and 44 country districts conducted by the Association of Municipal, School and Poor Law Officers of Health in the spring of 1932 it was found that:

... all of these social-hygienic measures had been reduced. The number of infant and preschool child welfare clinics had decreased, the hours of opening were reduced, and medical assistants were substituted by lay persons. Free distribution of milk, cod liver oil and medicinal foods to especially needy cases has been cut down; in Berlin free milk distribution has been reduced by 50 per cent.

School medical examinations, which used to take place four or five times during the school-life of the child, are now often carried out once or twice only or have been entirely abolished. In the fight against tuberculosis budgets have been sometimes cut by half; milk and disinfectants can often no longer be distributed; in many places admission to sanatoriums is being refused; and the work of dispensaries is seriously compromised. In the post-war years the placing of weakly, convalescent, and sick children in homes and sanatoriums proved one of the best means to improve the children's health. A backward trend can be observed from the statistics of the Verein Landaufenthalt fuer Stadtkinder (Country Holiday Fund), which shows that the number of children sent to recovery homes decreased from 215,656 in the 6 months April 1-September 30, 1930, to 128,652 in the months January 1-November 23, 1932.

Public health work suffers greatly from economic measures. In many cases social workers (Fuersorgerinnen) are still employed, but they have so much to do with inquiries into the economic situation of families applying for relief, that they are quite unable to pursue their proper social and hygienic tasks; another drawback of this new work is that it shakes popular confidence in the social case worker. (The German social worker does preventive health work as well as purely social case work.)

The curtailing of preventive measures has, of course, a serious effect on the health of the people, and especially of the children—the more so as in over 40 of the places mentioned the bad effects of the crisis have already been observed on the health of children. This enforced reduction, together with the increasing poverty of families unemployed for a long time, will undoubtedly in the course of the next months produce a disastrous effect on the German children's health. If, up to now, doctors could still report fairly good conditions among the child population, this can be attributed to the valuable and efficient public health system that has operated until recently, and also to the fact that the unemployed families have made use of all their resources.

It should be noted that even at the present time (May, 1933) a number of the leading pediatricists in the large cities such as Berlin, Hamburg, and Dresden maintain that the health of the infants and very young children remains good and that even the school children do not seem to be suffering

unduly. They point out, however, that the children between 3 years and school age are showing the greatest strain, both physically and mentally.

In the actual state of affairs, one of the most important assets in Germany, besides the family reserves mentioned above, is the present system of well organized public health work, with an efficient medical service dealing with the care, feeding and education of the infant, the preschool child, and school child. Proof of the real or apparent private reserves, either exhausted or still available, may be seen in the very slow decline of the general health standard. The value of small allotments, where vegetables, fruit, and potatoes can be grown, is considerable. These advantages compensate the winter discomforts of the small huts built in these allotments: space restrictions, bad lighting, inadequate heating, etc. During many months in the year they give the children the possibility of living and playing in the open. Many city families have developed contacts with country relatives and friends. Private organizations and neighbors help now and then. Any belongings of value are pawned. *The most important reserve, however—and the complete consumption of which is vitally serious—is the mother's physical and moral stamina.*

From medical reports we gather that, until recently, no lowering of health standards could be observed among children, contrary to observations made during the war, when the consequences of immediate lack of food were speedily evident. But today nearly all doctors agree that the normal rise in the standard of child health has come to a dead stop, or has fallen.

According to a Memorandum on health conditions of children in Prussian elementary schools (Preussisches Ministerium fuer Volkswohlfahrt, 1932) a falling off in the nutrition of children has been observed only since the autumn of 1931. . . . Many school teachers, kindergarten teachers and social workers call attention to the growing hunger of the children and all its consequences. . . . Professor Gastpar reports that the upward trend in child health in Stuttgart has come to a dead stop, that there is a marked fall in the nutrition of new pupils, and that active tuberculosis has much increased among school children since 1928.

German medical experts have not yet arrived at a unity of views on the unfavorable influence of parental unemployment on the health of the child. The ill effects of unemployment do not appear everywhere with the

same rapidity, because family resources vary largely (garden plots; relations in the country; remunerative employment of the mother; clandestine work), and also because the length of unemployment is an important factor. The proof that ill effects have greatly increased during the past 2 years can be found in the answer given to the *Deutsche Zentrale* by a large number of doctors who have experience among the unemployed. Contrary to the medical inquiry, the one made among a very large number of teachers of all denominations and political views, kindergarten teachers, heads of day-homes, social workers, and leaders of child welfare organizations, has stressed the fact that educational conditions are far more serious in the unemployed than in the working family.

All age groups, save the infant, are affected; and even the baby can suffer from nervousness and lack of mental balance in its surroundings. Among children of preschool and school age, the damage caused is already so

obvious that the united efforts of all public and private child welfare organizations are needed to ward off further and serious evil from the young generation. In many cases it is already impossible to repair the damage done. We must here take very serious exception to the view that the effects of poverty are identical in all families, whether they are unemployed, or working for insufficient wages that are scarcely better than the dole. Even when resources are reduced in both cases to a pittance, the rhythm of life is entirely different in a family whose members are idle. In an article published in the *German Red Cross Review* (*Wirtschaftsnot und Volksgesundheit. Blätter des Deutschen Roten Kreuzes*, Berlin, December, 1932), Professor Fritz Rott states that the mental balance of the unemployed is seriously disturbed. "Increased neurosis is perhaps the most serious danger to health caused by the present crisis. This increase is not sufficiently taken into account, because it is not easily recognized."

## PUBLIC HEALTH NURSING\*

**Visiting Nurses and Communicable Disease**—Back in 1923 Haven Emerson, M.D., of New York, said:

It would appear that many cities do not advise concurrent disinfection in either the major or minor communicable diseases, whereas instruction in the need and in the simple household technique of this procedure is well nigh universal wherever visiting nurses in public or private employ are permitted to give bedside care. Without concurrent disinfection little of real value to the members of the household follows from the procedures of isolation and quarantine. This is the one essential and elementary precaution in every sick room where there is a case of communicable disease. In the interest of the patient, the attendant, the other persons in the family or household, concurrent disinfection is of infinitely more value than terminal disinfection or the mere separation of the sick person in a room apart. Concurrent disinfection of discharges throughout

the period of communicability of the disease is the chief object of isolation. Where it is neither taught nor practiced, isolation is profitless.

The Superintendent of Nursing of the Metropolitan Life Insurance Company reported in this magazine this spring that in 1931 her company had expended more than \$4,000,000 for home nursing service to more than 800,000 of its own policyholders. In a close analysis of 200,000 of these it was found that only 5 per cent of the visits were made to patients suffering with measles, scarlet fever, whooping cough, diphtheria, and other communicable diseases, showing that visiting nurses are not doing this work to any extent. Is it because health commissioners do not see the possibilities or because they do not take advantage of them when they do see them?

Now comes the report of a survey of the *Communicable Disease Hospital*

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

needs of the Borough of the Bronx, City of New York. The Henry Street Visiting Nurse Service has included the care of acute communicable disease on its program for 15 years. Of the 9,366 communicable disease cases cared for from 1927 to 1931, inclusive, measles constituted 52 per cent; diphtheria, 9 per cent; scarlet fever, 21 per cent; and whooping cough, 18 per cent.

The cost of the Henry Street Visiting Nurse Service is \$1.15 per visit and the average number of visits in 1931 was 6.2 visits per case, representing an average cost of \$7.13 per patient. At the Willard Parker Hospital, where most of the Bronx communicable disease cases go, the average cost of hospital care of each case of diphtheria in 1930 was \$171; scarlet fever, \$234; measles, \$85; and whooping cough, \$194.

The survey states: "The low mortality among the patients under private medical care using the nursing service bears eloquent testimony to the favorable results of a high quality of visiting nursing in the care of contagion. The ratio of deaths to cases is extremely low."

#### REFERENCES

Haven Emerson, Control of Communicable Disease, Municipal Health Department Practice for the Year 1923. *Pub. Health Bull.* No. 164, p. 130.

Helen C. LaMalle, Trends in Public Health Nursing. *A.J.P.H.*, XXIII, 4:339 (Apr.), 1933.

*A Survey of the Communicable Disease Needs of the Borough of the Bronx, City of New York.* New York City Visiting Committee of the State Charities Aid Association.

**Every Public Health Nurse Should Have a Set**—A new set of five sex education pamphlets written by Dr. Thurman B. Rice replaces an older series published by the American Medical Association. The set consists of: *The Story of Life* (For boys and girls 10 years of age); *In Training* (For boys of high school age); *How Life Goes On* (For girls of high school age); *The Age of Romance* (For young men

and women); *The Venereal Diseases* (For both sexes, high school age or older).

Dr. Rice holds to the fundamental principle that civilization is founded on the home, yet he faces the fact that when young people come to learning about the processes of procreation they will no longer be satisfied with sophistry. He has taken the position that there can be no ignoring or isolating sex because it is so deeply interwoven with the mental, moral, and spiritual as well as the physical life.

The pamphlets reflect Dr. Rice's belief that no man or woman can understand his or her own sexual life and problems without understanding those of the other sex as well. He writes about sex for little children of both sexes in one pamphlet and uses the same methods in speaking to adults. He addresses high school boys and girls separately but teaches the same fundamental lessons to both groups and gives each a glimpse of physiology and psychology of the other sex. Yet he gives no descriptions or diagrams of sex organs; only such references to physiology as are needed for the discussion.

"The pamphlets are not medical treatises but intensely human and practical documents which display a real grasp of the needs in this field of health education."

Parents should use the pamphlets as a supplement to the confidential personal teaching necessary to transmit knowledge of sex to their children. They should read them first then turn them over to their children according to age. Teachers will find them useful for their own information and for the occasional instances when they have to function because the home has failed to do so. Doctors will find the set useful to recommend to parents.

The pamphlets are attractively printed and illustrated. The price is \$1.00 for the set of five or 25¢ for each

pamphlet.—Sex Education Pamphlets, review by W. W. Bauer, M.D., Am. Med. Assn., *Hygeia*, XI, 6:561 (June), 1933.

**Nurses Save Taxpayers**—How to save the taxpayers of the state, and at the same time give adequate relief to those in need—that is a problem which has taxed the ingenuity of both local and state relief officials.

Medical and nursing care for relief clients who are sick at home are classed as necessities of life, along with food, shelter and clothing, under the emergency relief act passed in New York State in 1931.

In many communities in the State, large sums of money have been expended to provide hospital care for relief clients who were unable to get adequate nursing care in their homes. In 1931 and 1932, some communities spent more of public funds for hospital care than they spent for all items of home relief—food, fuel, clothing, etc.

Both urban and rural physicians have cited instances in which, for the sake of safety, patients, not critically ill, have been sent to the hospital for a week or more at a time, simply because competent bedside nursing service was not available to the patients in their homes. The cost of a week in a hospital ranges from \$17.50 to \$38.50, with the average well over \$20 per week. In the few communities where visiting nursing service was available, a patient who would otherwise be sent to the hospital, was given competent care in the home for a fraction of the institutional cost.

The great need for nursing as well as medical care in the homes of the unemployed was strikingly shown in a sickness census made last December by the State Department of Health at the request of the State Temporary Emergency Relief Administration. It was found that while sicknesses were not much more numerous among the

families of the unemployed, they were, however, more prolonged. More than 40 per cent of those disabled by illness on the day of the census had been ill for more than a year. Among those who had been ill for less than a year, the average illness lasted more than three weeks.

On the basis of this report of sickness and a study of unemployment among qualified graduate nurses in the State, the Temporary Emergency Relief Administration made an allotment of funds to the State Department of Health, to inaugurate, under its supervision, a statewide system of bedside nursing for relief clients sick in their homes.

Since the middle of February almost 200 nurses have been employed at a weekly work relief wage of \$17.50 per week to give home bedside nursing to relief clients in more than half of the welfare districts of New York State. The allotments were based on the community needs for bedside nursing, the availability of qualified nurses in need of work, and the assurance that competent nursing supervision could be given locally.

This project, therefore, has been one of "double relief," both for the nurses and the sick.

The devoted work of these nurses has been revealed in numerous letters from patients, welfare officials, and nursing agencies. In one family, the parents of a sick child wrote that they felt the expert care given by the work relief nurse had saved the life of the child. In an upstate city, both state and local health authorities felt that the aid given by these nurses was invaluable in controlling a serious epidemic.

In several cities these nurses have aided the welfare officials in making sure that all the young children in needy families get fresh milk, cod liver oil and other protective foods so necessary to insure normal growth and devel-

opment, and to prevent the crippling effects of malnutrition and under-nourishment.

These nurses have been very active in the statewide campaign to protect each and every young child from the ravages of that age-old enemy of childhood, diphtheria. Has your child been protected by having 2 doses of toxoid or 3 doses of toxin-antitoxin? The treatments are both safe and painless.

These nurses do save taxpayers. They save money by reducing hospital

expense and lengthy periods of medical care. They save future misery and illness by giving health instruction to parents in their homes. They save lives by aiding in the protection of children against diphtheria and malnutrition, *and*, they insure ample dividends in the increased health and happiness of a great many citizens of this State.—H. Jackson Davis, Nurses Save Taxpayers, *News Service*, New York State Dept. of Health, Radio Talk No. 594, Tuesday, May 16, 1933.



## EDUCATION AND PUBLICITY\*

**What to Say About Low Death Rates in the Depression**—An outstanding problem in public health publicity and interpretation just now seems to be to get public opinion back of reasonably high standards of public health work in face of the generally low death rates which seem to make retrenchment much more safe than it really is. Dr. W. W. Bauer has contributed an excellent article on this subject called "The Death-Rate in the Depression," *American Mercury*, May, 1933, the whole of which all health workers will wish to read. He answers a frequently expressed defense of depressions with force:

The thought has also been advanced that enforced retrenchment in matters of food, in burning the candle at both ends through high-pressure business and hectic social activity, and in dissipation, will be effective in improving the health of the American people. Perhaps a few gourmands may be prevented from digging their graves with their teeth quite as fast as they might like to do; possibly a number of foolish debutantes are restrained from dancing themselves into a tuberculosis sanatorium or an early grave; conceivably business men now have less occasion to drive themselves to physical bankruptcy for the sake of piling up profits. But must we have a Depression that threatens the integrity of the whole world for these infinitesimal gains, doubtful benefits at the very best? Such arguments are the acme of futility.

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Another magazine article on the general question of stabilizing health department income is "Defending Health Budgets" by Paul O. Komora, *Hospital Social Service*, May, 1933. It can be had in reprint form from National Committee for Mental Hygiene, 450 Seventh Ave., New York City.

**National Award to Birmingham's Health Department**—*Birmingham's Health*, the bulletin of the Birmingham, Alabama, Health Department received one of five awards given this year by the Social Work Publicity Council. This was the only award in the public health field, the other citations going to the Survey Graphic; the Cincinnati Community Chest for its Women's Crusade; Chicago Council of Social Agencies for its News Letter; and the Welfare Council of New York for its newspaper publicity interpreting a study of boys' recreation needs in Brooklyn.

The citation to Birmingham reads:

It takes courage on the part of a health officer to speak out as openly about health dangers as about accomplishments because most communities are ostrich-like, squeamish about the possibility of injuring civic reputation. It is the quality of the frankness which shines from the pages of *Birmingham's Health*, the bulletin of the Birmingham, Alabama, Health Department, that wins admiration. The bulletin has been plain-spoken especially during the last twelve months about the dangers courted in cutting appropriations for health work, putting its messages on a wholesomely constructive basis. "Disease dies

He is the best leader who most fully understands the nature of things, so that his plans are not doomed to ultimate failure; who possesses an active, far-ranging imagination which can see many possibilities; who has a sense of values, so that among possibilities he is able to choose the most excellent; who has a sense of order, to give form, design and program to the values and purposes he selects; who has practical sense and judgment, and so uses the most feasible means to accomplish his ends; and who has the energy and enthusiasm to carry his plans persistently toward fruition.—*Antioch Notes*

down only when fought; and fought with time, energy, and money. Clean milk can be obtained only by paying for inspectors, veterinarians and laboratory technicians. Mosquitoes cannot be eliminated with propaganda and ballyhoo, but only with oil, drainage and hard labor."

Another of its commendable franknesses is in this matter of the current favorable health figures and the over-confidence this may bring. "We must not deceive ourselves. . . . If present day conditions . . . continue, we shall encounter a desperate tomorrow. With all the mobilized forces of science in a nation at war, the want and distress of 1914-1918 is reflected still in the health of the children of Central Europe born during these years. With less than the very best of modern science as expressed in preventive medicine and public health from the want of 1929-1933 will come a depression in health and strength and life which will last half a century."

This courageous health information is attractively presented. The bulletin has the feel of a friendly visitor who would be welcome in any household. The articles are brief; the subject matter pertinent and well selected. The style is straightforward, inspiring confidence, and while impersonal, it seems to speak directly to the individual reader. Yet it does not make a strained attempt to "personalize" the printed word.

The arrangement of the material is good. On the front page is a picture or graph. The inside cover page is a directory of the department personnel, stating plainly the room number and telephone extension, and on the back page current statistical facts. The typography and layout contribute much to make this bulletin noteworthy. Large, readable type and plenty of lead and margin space lure the reader on. Before he knows it he has read the entire bulletin. The use of modernized Roman for the headings gives it an up-to-date and fresh appearance.

Some of the cover pages are striking. The issue of April, 1932, makes excellent use of a graph in three dimensions. Clever and timely is the jigsaw design of the April, 1933, number, visualizing for the lay reader how little of the medical dollar is spent for public health.

Our congratulations to Dr. J. D. Dowling, and K. W. Grimley, bulletin editor.

**Reconstruction As of 1934—Key-note—**Each year the National Tuberculosis Association and its affiliated as-

sociations emphasize one aspect of tuberculosis control. This has come to be known as the Early Diagnosis Campaign. Reconstruction of public health will be the central theme in 1934.

Disaster has been averted by shoring up banking, industry, farming, and other institutions mercilessly shaken by the depression. It is time to reconstruct. Public health, never a sturdy enough structure, has suffered violent shocks. Patchwork will not do. Rebuilding on the solid foundation of modern medical knowledge is the best course. It will be the purpose of the campaign to show that by modern methods health can be secured. While tuberculosis organizations will emphasize the need of providing tuberculosis control facilities, it is hoped that all health agencies will participate in sounding the reconstruction note.

H. E. K.

**The Second Health Education Institute—**Dr. Iago Galdston will again direct the Health Education Institute, the second to be conducted by the Health Education Section. The dates are October 7 to 9, 1933, immediately preceding the American Public Health Association meeting at Indianapolis.

The theme proposed for this year's Institute is "The Psychology of Health Education." Three lectures will bring out principles of group education including motivation; application of psychological principles to definite health education instruments with examples and critical examination and analysis of existing health education materials.

In two round table sessions definitely assigned projects in health education will be discussed.

It is proposed to limit the student body to 60, with the whole group listening as a unit to the three lectures, and separating for round tables according to some convenient classification.

The "Jig-Saw" Simplified—Under another heading in this issue we are reminded of difficulties in deciding "what to tell the public."

An assortment of short articles believed to present what is true, insofar as we know what is true in the early months of 1933, comes in "What to Tell the Public About Health," recently issued by the American Public Health Association, 450 7th Ave., New York.

This collection of about 200 short articles is reprinted from the later issues of *Public Health News*, the monthly syndicated bulletin edited for the A.P.H.A. by John Hall.

The articles may be used as is. Paragraphs and sections may be copied. Any of the material may be re-written in the particular style of the individual health educator. The "Foreword" by Ira V. Hiscock points out some use possibilities.

A section on "Organizations That Supply Health Education Material" should prove useful. Discrimination will need to be exercised in making selections from the educational offerings of manufacturers included in this directory. The 9-point classification offered by T. J. Edmonds should be applied to what we accept from the business world for distribution.

"The Jig-Saw Puzzle of Health Publicity"—Under this title T. J. Edmonds has discussed in a conference paper an experiment he has made in checking newspapers and magazines for evidences of interest in the subject of health.

Here is what he discovered:

In the issue of *Liberty* of April 22, 1933, there were 24 advertisements. Twenty of these contained a health motive. Following are a few of the catch phrases:

Mouth happiness.

Squibb minded.

No time to neglect health. Be safe and fight colds.

Antiseptic kills germs even when it is diluted.

So easy on the hands.

Hair today and gone tomorrow.

Tones and strengthens your intestines.

Rich in vitamins B, C, D. The kind doctors advise.

Women call these wonderful tablets the internal cosmetic. They remove the inside cause of blemishes, pimples, headaches and that general run down feeling.

Brighten the eyes and clear up blood-shot condition.

One drop stops pain instantly.

Stop dandruff the pleasant way.

Corrects eczema, ringworm, pimples and rash.

Happy legs are here again.

Tums for the tummy.

Next I tore a page at random out of the Sunday issue of a metropolitan daily. It contained beside reading matter five display advertisements. The subject matter was as follows: "Bright woman lost 20 pounds"; Find why your feet hurt; The girl who had never been kissed, title; reading matter beginning "If you think yellow unsightly teeth are natural . . ."; The dread body odor no longer; The new Saxon-weave suit. Four out of five on the health motive.

This and other instances demonstrate interest in health but Mr. Edmonds finds little discrimination shown in the sources from which material is taken and its soundness. He classifies the published material under nine groupings as:

1. The knowingly false
2. Deliberately distorted
3. Wilfully exaggerated
4. Carelessly misrepresented
5. Hastily generalized
6. Honestly misinterpreted
7. Insufficiently checked
8. Incompletely proven
9. Scientifically established

Commenting on these groupings, Mr. Edmonds says that No. 1 can be safely left to the American Medical Association; groups No. 2 to No. 5 are:

an enormous and powerful assemblage, backed by money, organization and respectability. In the field of health publicity more than in any other, the public has been the victim of misleading publicity—some of it sincerely

mistaken—some of it carelessly regardless of the necessity of proof—some of it deliberately synthetic. . . .

Some catch-words that proclaim a pernicious philosophy have become popular—partly because they expressed an honest misconception that was popular. Such was "Don't sell America short," and such is, "Buy American." . . .

The same philosophy applies to catch-words in the health field. Some brevities are true or almost true—but it is the rare one that is righteous—it is an almost impossible task for the advertising artist to produce a sententious generalization that tabloids a truth in terse and striking terms.

Moses did it in the ten commandments. Christ did it in the beatitudes. Both of these sets of eternal brevities were composed on a mountain top. And occasionally some seller of good goods, some propagandist of a great idea, some missionary of a righteous cause, climbs up the arduous mountain slope of fact to the peak of inspiration and utters truth in words simple and few.

In groups No. 6, No. 7, and No. 8 Mr. Edmonds finds that social workers and health educators have been guilty and he cites some of the fallacies in our health slogans.

. . . Health workers often honestly draw misleading inferences from statistical trends. The trouble is that they do not use a control group. Here is an interesting instance of a correct conclusion reached by illogical methods. We have tried to demonstrate the adage, "Public Health work pays," by citing decreases in rates after certain work was begun. That didn't prove it. A parallel is not proof, and it is a common error to confuse sequence with causation. But the same conclusion has been proved by correct scientific methods. . . .

Many of us, I confess, have been guilty of trying to alarm the public about the increase in the heart disease death rate. Our motive was good—that heart disease in many respects is similar to tuberculosis and that it will to a limited degree respond similarly to a public health program aimed at reduction. And by such methods it has already been reduced in some states.

But our ballyhoo is vulnerable in several respects—and in our enthusiasm we have overbid our hand. In the first place heart disease is an embracing term. It includes a lot of separate forms of disease—all of the circulatory system, it is true. . . .

If all the ailments of the respiratory system were grouped together in vital statistics that disease, whatever it might be called, would be the leading cause of death instead of heart disease. . . .

So statistics are like mattresses—it always pays to slit them open to see what they are made of. Statistics are true only if properly interpreted, interesting only if humanized and valuable only if rightly used.

Now that we have discarded so many of the pieces of our puzzle you ask naturally if there is anything left out of which we can fit a publicity picture. Are we safe in saying anything?

One good rule is to play the game with the medical profession. If we make propaganda out of facts endorsed by scientific medicine, we will either be right or wrong in mighty respectable company. If we do not travel too far ahead of public knowledge—just a little in advance in the right direction—we are about as safe as one can expect to be in this changing world.

There seems to be a zone of white light wherein dwell facts that are well demonstrated and accepted by majority opinion. Few people now question the efficacy of immunization against smallpox and diphtheria. Few deny that safe water and safe milk have something to do with typhoid. No one will dispute the advisability of maintaining general bodily resistance. Whatever may be said about pasteurization and tuberculin testing I have heard no attack on mother's milk. Variety in foods producing something like a balanced diet appeals to our gustatory sense as well as our aversion to monotony. Brushing the teeth is defensible on esthetic grounds at least. Exercise brings its own easily recognizable reward, and loss of sleep its own punishment. Whether wet or dry politically we prefer that the man driving down the road toward us shall not have mixed too much alcohol with his gasoline. Although not frightened by the B.O. advertising we will at least agree that an occasional bath counteracts to some degree that peculiarly offensive racial aroma of the Caucasian. I never saw a vitamin, but I know that orange juice and prunes ultimately and indirectly improve one's disposition. And I wouldn't be without a first aid kit, a thermometer and a box of kleenex or its substitute either in a home or school.

And there's one slogan that I believe is a safe generalization: "The early diagnosis may catch the germ." There may be more.

So there are plenty of things we can say--

safely. Let's say them over and over in new ways. And the doubtful things we might discuss, saying "So-and-so says," or insuring ourselves against embarrassment by that convenient newspaper joker, "It is alleged."

**Nutrition Demonstrations for Relief Workers**—A series of nutrition demonstrations designed to instruct social workers and nurses how to advise families faced with the problem of selection and preparation of food with minimum expenditure was recently organized under the auspices of the Newark Welfare Federation.

The coöperating agencies included the nutrition department of the public schools and the Essex County Tuberculosis League.

The assistance of the Director of Home Economics for the Public Service Corporation and the Home Demonstration Agent of the State Department of Agriculture was obtained by the Committee. The Public Service Corporation donated the use of its centrally located demonstration kitchen and a part of the food used. Flour was given by the Red Cross and the remaining expenses paid by the Welfare Federation. Newspaper publicity was arranged by the Essex County Tuberculosis League.

The program was designed to cover foods essential to health under emergency conditions and protective foods as well as economies in fuel, labor and equipment.

**New Popular Movies on Milk and Diphtheria**—Two new motion picture films, one on milk and the other on diphtheria, have been added to the loan library of the State Department of Public Health. They are available on 16mm stock only. The diphtheria picture is one reel in length, requiring about 15 minutes for screening. The milk picture is two reels in length and requires half an hour for screening. Both were made by the State Department of Public Health and relate al-

together to Illinois conditions. The photography was done by Dr. A. C. Baxter, assistant director of the Department.

The picture on diphtheria shows step by step how the medical profession and the health officials come into action when a case of diphtheria develops. Each essential procedure in the management of a case of diphtheria, from the moment when a physician is called by the family to the termination of quarantine, is brought out. This, of course, includes the taking of specimens for laboratory examination, treatment with antitoxin, quarantine, protection of contacts, etc. The importance of toxoid in protecting children is also emphasized as a feature of the picture.

The picture on milk relates to both production and distribution. All of the scenes are of farms, dairies and pasteurizing plants in Illinois. Every important step in the production and distribution of milk is shown with particular emphasis upon those processes, such as pasteurization, laboratory testing and bottling, which protect the consumer from unsafe or contaminated milk.

These pictures are available on loan without local cost in Illinois.—B. K. Richardson.

**New Movie for Medical Audiences**—A new motion picture film on approved methods and technic of taking and mailing specimens for diagnostic laboratory examination has recently been completed by the State Department of Public Health and is now available on 16mm stock only. Two features of the picture deal with taking specimens for the diagnosis of whooping cough by the cough plate method and of taking specimens that may be mailed for dark field examination. Other parts of the film show the technic of taking and the appropriate way to prepare for mailing blood, sputum and

other specimens for tests relating to syphilis, tuberculosis, typhoid fever, gonorrhea, malaria, diphtheria, etc.

A lecturer from the Department is available to discuss subjects covered in the picture. This motion picture film was made especially for the medical profession. It is available for the use of medical societies in Illinois without cost.—B. K. Richardson.

Where East and West Meet—  
From where this is written Honolulu seems to be near the end of the world—with a new world just beyond to the west.

But the Child Health Day edition of *Honolulu Star-Bulletin* looks like a special edition from any good sized home town. Advertisements and illustrations maintain the illusion of a nearby community. Articles by Health Department and Education Department officials and others complete the picture. One good story tells how a physician-father built up a backyard playground and garden for a young son. Philip S. Platt tells about Palama Settlement health work, and James G. Stone, Tuberculosis Committee and other health education activities, assembled the edition.

## BOOKS RECEIVED

THE VITAMINS IN HEALTH AND DISEASE. By Barnett Sure. Baltimore: Williams and Wilkins, 1933. 206 pp. Price, \$2.00.

GASTRIC ANACIDITY: ITS RELATION TO DISEASE. By Arthur L. Bloomfield and W. Scott Polland. New York: Macmillan, 1933. 183 pp. Price, \$2.50.

THE CLINICAL ASPECT OF CHRONIC POISONING BY ALUMINUM AND ITS ALLOYS. By Lep Spira. London: John Bale, Sons & Danielsson, 1933. 28 pp. Price, \$.75.

EPIDEMIOLOGY IN RELATION TO AIR TRAVEL. By Arthur Massey. London: Lewis & Co., 1933. 59 pp. Price, \$2.00.

THE DYNAMICS OF THERAPY IN A CONTROLLED RELATIONSHIP. By Jessie Taft. New York: Macmillan, 1933. 296 pp. Price, \$2.50.

DIET IN SINUS INFECTIONS AND COLDS. By Egon V. Ullmann. New York: Macmillan, 1933. 166 pp. Price, \$2.00.

NOTES ON VITAMINS AND DIETS. Daniel Thomas Quigley. Chicago: Consolidated Book Publishers, 1933. 128 pp. Price, \$1.00.

SEX EDUCATION PAMPHLETS. THE STORY OF LIFE, IN TRAINING, HOW LIFE GOES ON, THE AGE OF ROMANCE, THE VENEREAL DISEASES. By Thurman B. Rice. Chicago: American Medical Association, 1933. \$.25 each, Set \$1.00.

IOWA WHITE HOUSE CONFERENCE ON CHILD HEALTH AND PROTECTION. April 14 and 15, 1932. Des Moines: Iowa Pupils Reading Circle, 1932. 506 pp. Price, \$1.95.

## BOOKS AND REPORTS

Directory of Psychiatric Clinics in the United States—*Compiled and edited by the Division on Community Clinics of The National Committee for Mental Hygiene. New York: The Commonwealth Fund, 1932.* 165 pp. Price, \$1.00.

This is the third edition of a very useful reference book for all those interested in the development of psychiatric services for children, neurological clinics, and mental hygiene societies. For convenient reference the material is arranged alphabetically by states and localities within each state. "No attempt is made to evaluate the service of the clinics, but the Directory does indicate the type of organization and the scope of the work in each case." Private clinics do not come within the purview of this survey.

Of the 674 clinics listed in the Directory, 232 have staffs made up of a psychiatrist, psychologist, and psychiatric social workers. About 50 clinics serve adults exclusively. Since the 1928 Directory was published, there has been a net increase of 130 clinics for children.

The first section of the Directory outlines the mental hygiene activities of the federal government, including a list of the neuropsychiatric hospitals operated by the Veterans' Bureau and naming the officers in charge.

The foreward states that "a further service relative to the work of clinics may also be mentioned. The generally recognized desirability of comparable records and statistics led to an effort in this direction by the staffs of the clinics operating under the Commonwealth Fund demonstration program. This work was under the supervision of Mary Augusta Clark, research statis-

tician of the former Joint Committee on Methods of Preventing Delinquency, and now of the Commonwealth Fund. Advisory statistical service has been given not only to the demonstration clinics but also to the resulting permanent clinics in the various communities. Other clinics as well have shown interest in this work and have sought counsel and help, which is given to the extent permitted by Miss Clark's other duties. *Recording and Reporting for Child Guidance Clinics* (published by the Commonwealth Fund in 1930), represents the accumulation of tried statistical methods of child guidance clinics and is recognized as the standard guide in this field.

RICHARD A. BOLT

Twenty-First Annual Report of the International Association of Dairy and Milk Inspectors—*Compiled by Paul B. Brooks, M.D. Albany, N. Y.: State Department of Health, 1933.*

This report contains much of unusual interest and value, and deserves a wide circulation not only among those directly concerned in the production and handling of milk, but also among health officers and physicians.

We would direct especial attention to the article by W. E. Krauss, of the Ohio Agricultural Experiment Station, showing that according to biological assays, the pasteurization of milk does not injure its nutritive qualities except for a partial destruction of vitamins B and C. Since pediatricians and physicians have generally been furnishing supplementary diets to guard against this, their partial destruction is not a serious problem.

Deserving of special attention is the

symposium on Nutritional Quality Developments in Certified Milk, and the Reports of four Committees on Communicable Diseases Affecting Man, Milk Plant Practice, Sanitary Control of Ice Cream, and Food Value of Milk and Milk Products. The last is extremely valuable, being a critical review of some 71 different articles.

While these have been selected as being of particular interest and importance, the whole report is made up of papers of unusual excellence.

The importance of milk in nutrition is so well recognized and methods of handling it, fortifying it, and modifying it are being proposed so frequently, that all should be glad to have authentic pronouncements upon it.

MAZÏCK P. RAVENEL, M.D.

Research on the Constitution of the Japanese with Special Reference to the Physical Capacity—By Dr. Yukinobu Yoshida, Expert in the Japanese Governmental Institute for Research of Physician Training, "School Hygiene," July, August, September, October and November, 1932, Imperial School Hygiene Association, Tokio, 200 pp.

This report is written in Japanese. The author not only writes of his own researches regarding anthropometry in the last 7 years, but also presents the work of others. Dr. Yoshida studied height, weight, chest girth, the difference of chest girth between respiration and expiration, abdomen girth, upper arm girth, thigh girth, calf girth, back strength, grasp strength, shoulder breadth, hip breadth, chest depth, length of legs, length of arms, pulse rate before and after exercise, blood pressure, lung capacity and thickness of skin, measuring 160,000 school children (elementary, high, and college boys and girls), athletes, soldiers and laymen. Much attention was paid in eliminating error from each item; for

example, error by apparatus or posture, and time difference in measuring height.

The tables of the Japanese averages are from 6 years to 18 years and cover the following items:

- Average height according to the age
- Average weight according to the height and age
- Average lung capacity according to the height and age
- Average chest girth according to the height and age
- Average back strength according to the height and age
- Average increase and recovery of pulse rate after the exercise (20 times the knee bending), according to height and age

Suggestions were given to improve each physical strength, and the importance of chest girth and lung capacity with regard to the health was noticed.

Thus Dr. Yoshida discusses the Japanese constitution from the standpoint of physical capacity, and compares these measurements with those of other nations. He concluded that the Japanese physical capacity is not very low until 17 years, but distinctly low in adults, although there has been an increase in height and weight of Japanese adults 20 years of age, as shown in the following:

	Height	Weight
1910	61.9	114.4
1920	62.4	115.6
1930	62.8	117.2

YUZURU NOZU

The Policewoman's Handbook—By Eleanore L. Hutzel, assisted by Madeline L. Macgregor. New York: Columbia University Press, 1933. 303 pp. Price, \$2.00.

In cities progressive enough to have them, policewomen are important factors in the warfare on crime, particularly as it is concerned with the protection of women and children and the prevention and control of sex offenses. The duties and responsibili-



ties of these specialists in this field of social work have been ably set forth in this excellent book. It discusses such pertinent topics as patrol and inspection, undercover operations, investigation of complaints, criminal law procedure, the preparation of cases for courts, evidence, and detention. Several interesting chapters are devoted to case reports, while appendices give time schedules and sample records. The book is well printed, has a comprehensive bibliography, and a good index. Social hygiene workers should find it of great value.

JAMES A. TOBEY

**Why We Do It—A Study of Normal, Subnormal, and Abnormal Human Behavior—***By Arthur R. Daviau, M.D. Boston: Meador Publishing Co., 1931. 231 pp. Price, \$2.00.*

The author's chief thesis is that, in most instances, people in the practical field of human behavior have taken a theory and then adjusted the facts to coincide. Interestingly enough, the author seems guilty of the same fault for which he criticises others. In the first part of the book, he is particularly critical of Dorsey's work *Why We Behave Like Human Beings*. His criticisms are aimed particularly at Dorsey's interpretations of his material. However, the author also disapproves of the methods used by education, religion, psychology, psychoanalysis, and public health. In most instances he presents no data for his own conclusions which are, for the most part, his opinions.

His willingness to generalize from the statement made by one person is shown by the following (page 215): "A psychologist once said 'The most obscure race of people on the face of the earth today is youth. Nobody understands them.'" On this statement, the author then generalizes and concludes (page 217): "According to psychology, youth is a riddle, an un-

solvable problem; and psychologists, apparently, at least, admit that they can do nothing for youth."

He manifests a rather evident lack of familiarity with his subject in general as indicated by his use of such terms as "subnormal behavior" and "abnormal behavior," neither of which he defines, and also with many of the problems which he discusses, for example, when he states (page 221) ". . . mental defectives who in reality are partially insane."

Interestingly enough, he criticises the educational approach because it is too greatly characterized by the use of psychological principles since (page 41) "The teachings of psychology have been rebuilt in the last decade," it should not have the influence it has in education or the training of children. He regrets exceedingly that eugenics is not given a more important field in the sense that it deserves.

The author also seems to believe that there is an undue tendency (page 80) "to boast of the general lowering of the infant mortality rate in the United States . . ."—and without giving any proof or facts, he concludes (page 81) ". . . one would be justified in believing that our infant mortality rate is being lowered most pronouncedly in and among the mental defectives. . . ." It is surprising that a public health officer, in his desire to emphasize the all important rôle of heredity, would ignore that a great deal of the lowering of the mortality rate is an accomplishment of preventive medicine and not of welfare work among mental defectives, and that such diseases as diphtheria, smallpox, typhoid fever, and the like, are not respecters of race, creed or intellectual level.

Another example of the author's interesting method of drawing conclusions is shown (page 63) in discussing a report on state wards, where he quotes ". . . 64 per cent were

taken away from their parents due to marked neglect; 15 per cent due to cruelty on the part of the parents; 11 per cent due to habitual exposure of children to immorality; 10 per cent were orphans." The author then concludes: "From the above tabulation, it can readily be seen that, discounting the orphans altogether, we have at least 90 per cent of the state wards who are the descendants of mentally deficient parents." This deduction is rather indicative of the author's lack of adequate appreciation of the motivation underlying human behavior.

This is further shown in the following statement (page 82): "From her (public welfare worker) statement that neither the father nor the mother wanted the child, I was inclined to believe that this child was illegitimate. . . ." Unfortunate as it may be, studies of family situations reveal that other than feeble minded parents not infrequently have children they did not desire. Neither is it unusual for the mother of an illegitimate baby to be extremely fond of her child.

In the second part of the book, the author presents his own theory of human behavior and posits as the basis the existence of "psychical (mental) originators and the psychical (mental) center of associations." He mentions in this connection love, virtue, vice, belief, courage, bravery, color, thought, etc. This theory of the author has something of the familiar ring of phrenology.

The author also presents his own theories on sleeping, dreaming, and being awake.

This volume offers little of scientific value to the worker in the field and is but a presentation of a eugenic viewpoint the author himself has developed primarily on the basis of his 5 years' experience as a public health officer and city physician. He presents no scientific research to justify his conclusions

which are, for the most part, opinions and assumptions. The book, however, is very interesting reading, although a great many actively working in the field will disagree with many, if not most, of the author's own theories and his quite general denunciation of most of the existing ones.

FRANK J. O'BRIEN

**A Decade of District Health Center Pioneering: A 10-Year Report of The East Harlem Health Center**—*New York: Published by the East Harlem Health Center, Inc., and the New York Chapter of the American Red Cross, 1932. 148 pp. Price, \$1.00.*

The East Harlem Health Center is one of the notable demonstrations in New York City showing the advantages of operating a department store in health. When it was started in 1921, it did not have the financial stimulus of a large fund such as Mr. White left to Boston. It did have the backing of the American Red Cross for an experimental period of three years after which five foundations provided most of the money. There was no special building erected to fossilize mistakes in theory before experimental evidence through actual work had accumulated. Eventually, in three remodeled houses, twenty-one organizations found headquarters and certain facilities in common. Having completed a decade of work, it is now proposed to turn this health center over to the city of New York as a going concern to be housed in a special building the city fathers are to provide if and when able to do so.

In readable fashion, this illustrated report tells the fascinating story of why and how the East Harlem Health Center came into being. For one thing during this ten year period, 715,445 clients visited the health center, and going the other way, staff member visits to or on behalf of the residents of East Harlem

totalled 708,091. The total cost was \$316,648 or 22 cents per visit if you want to put it that way. Consequently, or at least very largely so, all sorts of disagreeable mortality and morbidity rates decreased.

W. W. PETER

**Laboratory Manual, Methods of Analysis of Milk and Its Products**—*Compiled by the International Association of Milk Dealers, 228 No. LaSalle Street, Chicago, Ill.* 461 pp. Price, \$5.00 to public health officials, \$7.50 regular price.

This book, or manual as it is properly called, is the result of two years of work by practical laboratory men who have assembled tests found most useful in the milk or ice cream plant laboratory. The five parts of the manual cover the following subjects: organization of a dairy laboratory; bacteriologic control methods; chemical and physical control methods for dairy products; bacteriologic, chemical and physical tests for non-dairy products; preparation of bacteriologic mediums, standard solutions, indicators, and a useful appendix of handy reference data.

This will prove useful to milk plants which have or are contemplating the development of laboratories, to public health laboratories, and to colleges where instruction is given in dairy methods. A prospectus has been prepared which will be furnished upon request by the Association.

IRA V. HISCOCK

**Improvised Equipment in the Home Care of the Sick**—*By Lyla M. Olson, R.N. (2d ed.) Philadelphia: W. B. Saunders Company, 1933.* 197 pp. Price, \$1.25.

This is an entirely new revision of Miss Olson's work, first published in 1928. This is small and compact, containing 197 pages and a total of 285 illustrations. The contents of the 60 chapters are well indexed thus making

it very convenient as a reference book.

The subject matter covers every type of appliance and equipment that a nurse might find herself in need of and may not have at hand. The directions for improvising and the many illustrations provide means whereby any nurse can create the equipment she needs. The so often heard and probably just criticism, that a nurse in the home so often requires so many things that she becomes an expense account could somewhat be eradicated if every student nurse became familiar with this book. The suggestions given could also be adapted to the smaller hospitals which do not have finances for expensive equipment.

This book is a fine contribution to nursing education. Public health nurses especially will find it very useful, since their field of work is the home. They will also find that the content would make valuable material for staff education and demonstrations.

However, every nurse, regardless of her type of nursing, will find it very useful and as stated by Clara D. Noyes, National Director of American Red Cross Nursing Service, in her foreword, "We hope, therefore, that this little book finds its way into the schools of nursing of this country and that the students become familiar with its contents before they embark upon their careers." FLORENCE E. SPAULDING

**A General History of Nursing**—*By Lucy Ridgely Seymer. New York: Macmillan, 1933.* 317 pp. Price, \$2.75.

Instructors of Nursing and students will find that this book contains very definite and dependable information on the history of all types of nursing and nursing organizations. The bibliography shows rare judgment in the selection of material from many sources which gives continuity to the historical data. The book is written in a simple,

straightforward manner with a depth of feeling which inspires one with a desire to cherish each historical event.

The author, appreciating the value of state, national, and international nursing organizations, conveys to the reader very definitely the assistance rendered nurses by their professional affiliations. The graduate will find here much material for refreshing her memory in the history of nursing.

RUBY ROGERS

**Hospitals and Child Health—***White House Conference on Child Health and Protection. New York: Century, 1932. 279 pp. Price, \$2.50.*

This book is a splendid report. It is an informative study of what the hospitals are doing for the health and protection of children. The study is divided into three parts:

1. *Hospitals and Dispensaries*—The survey showed that enough beds are available for the care of white children in hospitals but care of colored children is woefully inadequate. The beds for children are not controlled definitely by a pediatric staff. Special internships in pediatrics are few, and the training of nurses in pediatric wards is inadequate. "While the general surgical and medical conditions are well looked after, the care of mental and venereal conditions are not provided for as they should be."

2. *Convalescent Care*—(A) *What is being done:* During 1929, 22,141 children were cared for in convalescent homes, 27 per cent of these homes being affiliated with hospitals. Facilities for the care of the convalescent negro children are not adequate. (B) *What should be done:* There should be more facilities for the care of the convalescent negro and specialized cases in general. The sub-committee gives exhaustive conclusions and recommendations.

3. *Medical Social Service* — (1) There are 554 social service departments in hospitals and dispensaries of

this country. (2) Application of tests to the service now being rendered through social service in medical institutions. Medical social service in the protection of the child and his health must go beyond the child patient, for disease and social difficulties of parents and older members of the family may bear heavily on the child. A total of 1,389 placements in foster homes were made by 153 medical social service departments in 68 cities. (3) The lines along which activities of medical social service should be encouraged are covered well in a section on conclusions and recommendations.

ELDRED V. THIEHOFF

**The Rise of Preventive Medicine—***By Sir George Newman, M.D. London: Oxford University Press, 1932. 270 pp. Price, \$3.00.*

This book is made up of the Heath Clark Lectures, 1931, delivered at the London School of Hygiene and Tropical Medicine, the first series given under this bequest. We have often had occasion to speak of the facility and knowledge with which Sir George Newman writes on matters of public health, and it is needless to add that no man could be found better fitted to inaugurate this series of lectures than himself.

Beginning with folk-lore, magic, custom and religion, the author carries us through the development of preventive medicine, which of course includes much of general medicine, physiology and other cognate sciences, down to the present, concluding with a chapter on the collective and communal organization of preventive medicine. Each chapter is preceded by a synopsis. The book as a whole shows an enormous amount of study. It contains many statements, some quoted, and some original, which can well serve as aphorisms. The author considers that the bedrock principle of preventive medicine is anchored in anthropology,

the science of the biological history of man; and holds that folk-lore and magic formed the beginning of the science and art of medicine, in which he agrees with Sir Clifford Allbutt.

Needless to say, Egypt comes in for considerable attention, as it was the focal point at which various civilizations were centered and where cross-fertilization took place. The medicine of that country was a palimpsest of medical learning, though needless to say, it was very much mixed with superstition, demonological lore, and other ideas which blocked progress to a greater or lesser extent. Moses was "learned in all the wisdom of the Egyptians," and almost the first organized documents concerning medicine are contained in what is known as the Mosaic Law. It is Mosaic in origin and texture, the author says, but was formulated between 1400 and 1250 B.C., its earliest records having been written in the 10th or 9th Century by some prophet of Judah, and cast into one form somewhere about 722 B.C. None of the constituent documents were written by Moses, though what he said to the children of Israel might well have been their origin and inspiration. A review of the 8 points made in this Law will convince anyone of its value, and Sudhoff said: "Had Judaism given nothing more to mankind than the establishment of a weekly day of rest, we should still be forced to proclaim her one of the greatest benefactors of humanity."

Greece also comes in for serious consideration, and concerning the Greek spirit, Sudhoff is quoted as saying: "It first clearly grasped the aims and inwardness of hygiene." Drainage for malaria was proposed in this country between 500 and 430 B.C. by Empedocles, "a physician with a practical sense of prevention." All students of medicine recognize how much we owe to the Greeks. Sir Clifford Allbutt

summarized this: "There were for the wiser Greek physician three factors of safety: he was free from magic, he never forgot to treat the individual, he was a master of hygiene."

One is tempted to keep on giving quotations from this excellent presentation, containing much that has been known and forgotten by some and new to many. The author holds that nothing educates people more than sanitation, and stresses preventive medicine in action as an educator of the public, saying that he has known the purification of a water supply in a village to raise the moral standards of the community.

Sir John Simon says of preventive medicine, "It is the province where Medicine joins hands with Common Sense." The last chapter ends by following this great pioneer in urging reliance on the strength of the people for self-help and upon the solicitude of the community for the welfare of its weaker members. "Altruism and kindness of man to man, combined with foresight, true economy and common sense are among the forces which can most wisely apply the verities of the science and art of Preventive Medicine to the needs of men."

This is the most ambitious work which the author has published. Every page is full of meat. The illustrations are fine, and we wish that more pictures of pioneers in preventive medicine might have been given us.

The printing and make-up are what we have learned to expect from the Oxford Press. It is a matter of some regret that although these lectures were given in 1931, they appeared in print late in 1932, and have been received in this country in 1933. There are few books on public health which can be recommended more heartily and completely than this.

MAZÛCK P. RAVENEL, M.D.

General Principles Governing the Prevention of Tuberculosis—By Dr. E. Burnet. *Geneva: Quarterly Bulletin of the Health Organization, League of Nations. Distributed in the United States through the World Peace Foundation, Boston, December, 1932.* 174 pp.

This very comprehensive report is a result of two years of work on the part of Dr. Burnet, who was secretary of a "Reporting Committee" appointed by the Health Committee of the League of Nations to report on the question of tuberculosis control throughout the world.

Dr. Burnet not only drew on articles already prepared, but conducted field studies in Germany, Austria, Denmark, France, Great Britain, Italy, The Netherlands, and Yugoslavia. Unfortunately for the readers in the United States, very little is said about the tuberculosis program in this country or Canada. Dr. Burnet explains this by saying that he had "no direct knowledge of Canada or the United States of America, or of Japan or Russia." However, he says that his intention is not to present a complete picture, but rather to lay down the general lines for efficient organization.

The first premise is that tuberculosis is a "social disease" the control of which is to be effected fundamentally by organized community activity, or what is commonly known in Europe as "social hygiene." It is impossible in a brief review of this sort to state the facts upon which he bases this premise. However, he discusses the decline in the tuberculosis mortality, the reasons for that decline and the social factors which underlie it. His contention is that the decrease in the tuberculosis death rate is a matter primarily of progress in civilization which includes improvements in all social factors plus specific anti-tuberculosis measures undertaken in the various countries.

Concerning these specific measures, Dr. Burnet feels that the dispensary is the important and pivotal agency in the campaign against tuberculosis and that it should become more and more a central clearing place through which all tuberculous persons should pass, and be directed to the care and treatment which is best suited to each case. He feels that the dispensary should not only take cases which come to it, but should go out and seek the people who need care, putting on, if necessary, a thorough case-finding study.

Dr. Burnet traces the revolution which is taking place in sanatoria. At first they were only places where persons suffering from tuberculosis were kept from infecting others. Then came the realization that along with the practice of collapse therapy the sanatoria could become hospitals and great strides made in the curing of tuberculosis in them. The third step was to make the sanatoria great centers from both the medical and preventive points of view, valuable both to the individual and the community. He calls this revolution the "hospitalization of sanatoria."

As to the results of collapse therapy, the author is none too sanguine. He feels that much of this work could be done in dispensaries and that thereby the dispensary could be a center for epidemiological research. He stresses the importance of the nurse in the scheme of tuberculosis control, and discusses the rehabilitation and after care which he feels must be linked up with sanatoria. In this connection he advocates that villages be built around sanatoria for ex-patients which shall serve as health centers.

The author finds that the experiments with BCG throughout the world point to favorable results and ventures the thought that as the years go by greater use will be made of it.

The entire question of bovine tuber-

culosis is discussed, based on studies in several countries. He quotes from Möllers that, "The proportion of bovine bacillus infection to all cases of human tuberculosis is 2.8 per cent" and suggests that it will be wise to abide by the conclusions adopted at the 1912 Rome Congress: "The infection of human beings by the bovine bacillus is much less frequent than their infection with the human bacillus. At the same time the measures recommended against infection by the bovine bacillus should be maintained."

In Part III, the author discusses the political and administrative framework in all the countries under discussion. The first sentence of this section is as follows: "The history of the campaign against tuberculosis shows that the first action was taken by private organizations. The State intervened later on to support and regulate this action." And again, "In no nation has the State directly completely taken over the campaign against tuberculosis." . . . "Private initiative can never be sufficiently far-reaching, methodical or generous to conduct the campaign against tuberculosis single-handed." The question of health insurance as practiced in the various countries is exhaustively discussed.

The fourth section covers the cost of tuberculosis work in the various countries studied. This is very enlightening and very valuable since it brings together for the first time definite figures concerning the amount spent for tuberculosis work.

In conclusion, the author brings together the principles of prophylaxis and gives in fairly brief space the implications of a complete tuberculosis program. One or two quotations are significant: "Tuberculosis is not the only endemic or epidemic disease from which mankind is suffering, but it is the most difficult to eradicate, and on it hygiene will therefore test its power.

If a man can conquer tuberculosis, he will be able to rid himself of the other ills which beset him. The struggle with tuberculosis will be the supreme test of social hygiene."

The reader of this article will learn nothing regarding the tuberculosis program in this country, but he will grasp the fundamentals of tuberculosis control as practiced throughout the world and will feel the trends of that work from an international standpoint. It is a remarkable article and a very important résumé to date of tuberculosis work. JESSAMINE WHITNEY

**The Vitamins in Health and Disease**  
—By Barnett Sure, Ph.D. Baltimore: Williams & Wilkins, 1933. 206 pp. Price, \$2.00.

"New discoveries," wrote Dr. Harvey Cushing of medical science in the latter part of the nineteenth century, "were being announced like corn popping in a pan." Much the same condition exists today with respect to research on the vitamins. Results of investigations on these formerly elusive substances are reported so frequently and extensively that the bio-chemists themselves are somewhat bewildered by them. Sanitarians and physicians, who have many things to ponder over, often find it virtually impossible to keep up with the latest important developments in nutritional science.

This book, prepared by an authority in this particular field, will be welcomed as a concise review of modern knowledge regarding the vitamins, which are conceded to be of vast significance to human health. The book is written in a simple style, with no attempt at dramatics. It will appeal to the intelligent rather than the average reader and it should prove of real interest and value to health workers. Occasionally the author has a tendency to indulge in speculation, but most of the material is strictly factual. Like all of the books

issued by this publisher, it is exceptionally well printed. There is a brief foreword by Dr. Walter H. Eddy, whose recommendation of the text to all in-

terested in the relation of diet to health can be seconded by the reviewer.

JAMES A. TOBEY

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Another Glance at the Wages of Diphtheria Prophylaxis**—Diphtheria immunizationists will find comfort in the annual tabulation of results, for those cities doing the best work in prophylaxis are, in general, enjoying the lowest mortality rates. Diphtheria is relatively most prevalent in the Southwest which formerly had lower rates than the rest of the country.

ANON. Diphtheria Mortality in Large Cities of the United States in 1932. J.A.M.A. 100, 20:1595 (May 20), 1933.

**Typhoid Fever Drops Again**—The annual summary of typhoid rates in the large cities concludes with: "Whatever the case as regards rural communities and the smaller cities, it is evident, now that the returns are all in, that the larger cities of the United States experienced no increase in typhoid mortality in 1932 but, instead, a substantial reduction."

ANON. Typhoid in the Large Cities of the United States in 1932. J.A.M.A. 100, 19:1491 (May 13), 1933.

**More About Rheumatism**—One would suppose that the subject of rheumatism had been pretty effectually explored, but here is another British symposium which works over again the old familiar sod. Included as usual are the health, economic, social and industrial aspects.

BROWN, W. L., *et al.* Rheumatism and Arthritis as a Public Health Problem. J. State Med. 41, 5:250 (May), 1933.

**Pointed Aesculapian Philosophy**—Much that will give pause to the ardent proponent of preventive medicine will be found in this scholarly dissertation on the philosophy of medical practice. The author pays his respects to the well known Committee on Costs with some delightful banter. Good for all to read.

CUSHING, H. Medicine at the Crossroads. J.A.M.A. 100, 20:1567 (May 20), 1933.

**Who Shall Practice Public Hygiene?**—Shall educational qualifications for health workers be set up and, if so, who and what shall qualify candidates? These questions are posed but not fully answered in hope that the discussion provoked may bring us one step nearer the solution of this difficult matter.

FERRELL, J. A. Professionalization in Public Health Work. J.A.M.A. 100, 18:1380 (May 6), 1933.

**A Doctor Looks at the Baby Clinic**—No one doubts the educational value of infant welfare clinics; all know that they help mothers who can afford to pay, says the author. What's the answer? "If a mother knows that her private doctor has a systematized plan of following her child and that he is really interested," she will come to his office by appointment rather than wait "half the afternoon with a swarm of other women and contagious children." After that, there follows some searching



criticism of present conditions in practice.

HILL, L. W. Child Health Conferences and the Doctor's Bread and Butter. *New Eng. J. Med.* 208, 18:942 (May 4), 1933.

**Looking for Abortive Poliomyelitis**—Methods for the detection of abortive cases are discussed, and the records are made of five small community outbreaks. Clinical poliomyelitis is probably four times as frequent as usual statistics indicate.

PAUL, J. R., *et al.* Studies on the Epidemiology of Poliomyelitis. *Am. J. Hyg.* 17, 3:587 (May), 1933.

**Southern Contributors to Public Hygiene**—Brief biographies of the leaders in public health who came from, or did their work in, the Southern states. This will furnish useful material for the historically-minded sanitarian.

LEATHERS, W. S. Pioneers in Public Health In the Southern United States. *South. M. J.* 26, 4:306 (April), 1933.

**Foreign Views of Our American Diphtheria Propaganda**—"We in this country (Great Britain) are apt to look askance at the flamboyant methods of propaganda used by our brethren on

the American continent. . . . The time has come, however, when in the light of results achieved we *must* doff the cloak of ultra-respectability and tackle the job on the lines of the American merchant who, having goods to sell, finds that publicity pays." These sage comments are interlarded in a comparison of British and American methods and results.

NASH, E. H. T., and FORBES, J. G. Diphtheria Immunization: Its Possibilities and Difficulties. *Pub. Health* 46, 8:245 (May), 1933.

**Colds by the Boat Load**—Another study of colds in an isolated Arctic community reveals the same findings as earlier research. About 48 hours after the first boat in spring, an outbreak of colds begins which eventually includes most of the inhabitants who remain free from colds during the season in which there is no communication with the outside world. None of the organisms of the usual nasal flora seemed important.

PAUL, J. H., and FREEZE, H. L. An Epidemiological and Bacteriological Study of the "Common Cold" in an Isolated Arctic Community (Spitzbergen). *Am. J. Hyg.* 17, 3:517 (May), 1933.

# NEWS FROM THE FIELD

## SEPTEMBER 1932 AND JANUARY 1933 JOURNALS NEEDED

**D**UE to unusual demands for last year's September number and this year's January number of the Journal, the Executive Office finds itself in need of several copies of each issue. It would be greatly appreciated if members who can spare these Journals would send them to headquarters. Each member who complies with this request will be reimbursed for the postage used.

## DR. RICE AND DR. RUHLAND SAIL

**A**MONG the 17 guests of the Oberlaender Trust who sailed last month for a six-month study of cities in Germany were Dr. John L. Rice, Health Officer of New Haven, Conn., and Dr. George C. Ruhland, Commissioner of Health of Syracuse, N. Y., both Fellows of the A.P.H.A.

## JOURNALS MERGE

**T**HE journals *Archives of Physical Therapy*, *X-Ray*, and *Radium* and *Physical Therapeutics* have consolidated, retaining the name of the former. These journals were the official organs of the American Congress of Physical Therapy and the American Physical Therapy Association, respectively. The merging of the journals is the result of the amalgamation of the two organizations into the American Congress of Physical Therapy.

## HOMER FOLKS GIVES DELTA OMEGA LECTURE AT YALE

**T**HE 1933 Delta Omega lecture at Yale University was given on April 24 by the Hon. Homer Folks, of New York, Fellow A.P.H.A. His subject was "Public Health and Social Service."

## GERMAN GOVERNMENT AID FOR SMALL- SCALE GARDENING

**T**HE Federal Government of Germany, which for the last year or two has been aiding the unemployed to establish small gardens, has recently provided another 25 million Reichsmark (about \$6,000,000) for that purpose. Out of this amount loans will be made to communities which in their turn will lend to individuals small amounts, 50-70 Reichsmark (about \$10-17), without interest, to be paid within 10 years. A community is entitled to a loan when it intends to establish a minimum of 20 gardens. The ground for each garden must be of a certain size and is to be selected with a view to the possibility of later adding a house to it.—*Archiv f. Soziale Hygiene und Demographie*, Berlin, Dec., 7, 6, 1932.

## STATE CHARITIES AID CELEBRATES

**T**HE Silver Anniversary Annual Conference of State and Local Tuberculosis and Public Health Committees of the State Charities Aid Association was held in New York City June 8-9, in celebration of the twenty-fifth anniversary of the anti-tuberculosis campaign in New York State, outside of New York City, carried on by the State Department of Health and the State Charities Aid Association.

## DR. LUEDDE AWARDED BLINDNESS PREVENTION MEDAL

**T**HE Leslie Dana Gold Medal, awarded annually for the most outstanding achievements in the prevention of blindness and the conservation of vision, was presented to Dr. William H. Luedde, Director of the

Department of Ophthalmology at the St. Louis University School of Medicine.

Dr. Luedde was selected for this honor by the National Society for the Prevention of Blindness in coöperation with the Missouri Association for the Blind, through whom the medal is offered annually by Mr. Leslie Dana of St. Louis.

#### NEW POSITION CREATED IN BALTIMORE

**D**R. ANTHONY L. RETTALIATA has been appointed Full-Time Medical Health Officer of the Baltimore Health Department. This is a newly created position in the Department.

#### NEW BUTTER RULING IN CINCINNATI

**T**HE Board of Health of the City of Cincinnati has adopted a regulation which requires that all butter sold in Cincinnati shall be made of cream from tuberculin tested cows in officially accredited areas, and that certification to this effect shall appear upon the label. This regulation will become effective September 1, 1933.

#### EXTENSION COURSE AT ALBANY MEDICAL COLLEGE

**T**HE Albany Medical College, in coöperation with the New York State Department of Health, devoted "Residence Week"—June 12-17—to an extension course for Health Officers.

The program included papers on epidemiological work, medical care of indigents during the present emergency, newer diagnostic criteria of tuberculosis, typhoid carrier control, water supplies and summer camps, milk control in New York State, childbirth mortality, orthopedic service of the New York State Department of Health, and a symposium on the venereal diseases. Also there were clinics on heart diseases, industrial surgery, syphilis, and undulant fever.

#### THE BLIND IN PALESTINE

**T**HE British Government is criticized for its indifference toward the blind of Palestine in a report by Subhi Dajani, of Jerusalem, published in the June issue of the quarterly journal of the American Braille Press, international organization which produces and distributes literature and music in raised print for the blind.

"The Government has so far provided no legislation for the relief of the blind. . . . There are three institutions which care for the education of the blind, though not exclusively. The best is the Jewish Institute for the Blind, which is entirely for Jews. The Syrian Orphanage devotes part of its buildings to the housing and education of the non-seeing, and finally there is a Moslem Orphanage. The number of blind in these establishments . . . is 190. . . . The total number of blind in Palestine is given as 5,000, though this does not include the sightless village populations. . . . most of the Moslem blind earn their living by reading the Koran after the dead. The streets abound with blind beggars."

#### SCIENTIFIC CRIME DETECTION COURSE

**N**EW YORK UNIVERSITY has announced the establishment of a department of Forensic Medicine at the University and Bellevue Hospital Medical College, to train medical examiners and toxicologists. The new department, one of the first of its kind in this country, is designed as an initial step towards establishing a system of scientific crime detection in this country which may some day rank with the system of medico-legal institutes of Europe.

Dr. Charles Norris, chief medical examiner of the City of New York, has been named Professor of Forensic Medicine and will head the department.

RESOLUTIONS ADOPTED AT THE FOURTH ANNUAL CONVENTION OF THE WESTERN  
BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION,  
PASADENA, CALIF., MAY 29-31

RESOLUTION I

WHEREAS: for many years past in this country the mortality and morbidity from preventable causes among the rural populations has remained stationary and exceeded that of the urban population, and

WHEREAS: numerous surveys including that of the New York State Health Commission, show a lack of co-ordinated and sustained effort to remedy these deplorable conditions in rural areas, and

WHEREAS: the only effort being made in such areas is an appropriation by the Federal Government through the United States Public Health Service and the appropriation of a few national private agencies, thus stimulating states and a number of counties to support rural health departments, and

WHEREAS: as a result of such expenditures in rural areas a material reduction in mortality and morbidity rates has occurred in these areas, and

WHEREAS: in the absence of such aid under present rural economic conditions many such efforts will be discontinued, and

WHEREAS: the need of such effort is particularly urgent in the Western states because of the likelihood of introduction of oriental diseases, and

WHEREAS: it has been the policy of the Federal Government to assist states and local communities in rehabilitation programs, and

WHEREAS: the foundation of these rehabilitation programs is the preservation of the public health,

NOW THEREFORE BE IT RESOLVED: the Western Branch, American Public Health Association in regular annual

meeting at Pasadena, Calif., on May 30, 1933, respectfully petitions that the Federal Government continue to recognize this responsibility by the appropriation of adequate funds for full-time county health units and rural sanitation.

RESOLUTION II

WHEREAS: the recent appearance of psittacosis in California and other Western states has established this disease as a distinct menace to the public health, and

WHEREAS: scientific investigations have proved that birds of the psittacine family, particularly parrakeets in California, are infected with this disease, and

WHEREAS: intensive research into psittacosis among psittacine birds in California together with the enforcement of adequate regulations governing the importation of such birds into the United States should necessitate stringent measures in the control of this disease, and

WHEREAS: the United States Public Health Service is rendering invaluable assistance to California and to all other states through the maintenance of its local laboratory for the study of psittacosis and through the enforcement of regulations governing the importation of psittacine birds,

NOW THEREFORE BE IT RESOLVED: that the Western Branch of the American Public Health Association request the United States Public Health Service to continue the maintenance of its laboratory for the study of psittacosis in California, and

BE IT FURTHER RESOLVED, that the United States Public Health Service be requested to take all necessary

precautions to prevent the introduction of psittacine birds into the United States, and

BE IT FURTHER RESOLVED, that these resolutions be spread upon the minutes of the Association and that a copy be sent to the Surgeon General of the United States Public Health Service.

### RESOLUTION III

WHEREAS: the Western Branch of the American Public Health Association realizes that, in this period of financial emergency when there is an unusual amount of personal distress and civic unrest, a great effort must be made to maintain the physical well-being of our citizens, most particularly the children, so that the communities may not be endangered by epidemics of communicable disease brought about by malnutrition and bad housing, and

WHEREAS: the Health Departments and their allied health and social agencies of the various communities are charged with the responsibility of maintaining the health and welfare of the citizens and must of necessity, meet the increasing demands brought about by these unusual times,

NOW THEREFORE BE IT RESOLVED: that the Western Branch of the American Public Health Association emphasize to our legislative representatives and various governing boards, the grave emergency that is now being faced by Health Departments and ask their continued and increasing support both morally and financially, and

BE IT FURTHER RESOLVED: that copies of this resolution be sent to the representatives of the above bodies.

### RESOLUTION IV

WHEREAS: economic conditions are such as to necessitate maximum efficiency in governmental activities, and

WHEREAS: many of the National Public Health Agencies will upon invitation, assign experts to state and local authorities for the purpose of surveying conditions and making recommendations as to the type of public health organization needed to obtain maximum results with the funds available,

NOW THEREFORE BE IT RESOLVED: that the Western Branch of the American Public Health Association in Annual Meeting at Pasadena, California, May 29, 30, and 31, 1933, bring to the attention of the proper state and local officials in their territory the necessity of this service, the advisability of this service and assist them upon request in contacting proper officials.

### RESOLUTION V

WHEREAS: the Colorado Medical Association and the Denver Health Council have sponsored a statewide public health survey by the United States Public Health Service and have initiated legislation designed to improve public health activities throughout Colorado,

NOW THEREFORE BE IT RESOLVED, that the Western Branch of the American Public Health Association commends the actions of the above organizations, and we recommend similar programs for the other Western states.

### RESOLUTION VI

WHEREAS: one of the major benefits of national conventions of the American Public Health Association is the activated interest in public health, developed in sections fortunate enough to be hosts to the convention, and

WHEREAS: allocation to some Western portion of the United States is contemplated for the convention next year,

NOW THEREFORE BE IT RESOLVED: by the Western Branch, American Public Health Association in its Fourth Annual Convention assembled, that we join the many public health, medical, and civic organizations in cordially inviting the American Public Health Association to hold its 1934 Convention in Southern California.

#### SEWAGE ASSOCIATION MEETS AT ROCHESTER

THE Spring meeting of the New York State Sewage Works Association was held at Rochester, N. Y., June 9-10. Papers were presented—on Vacuum Filtration of Sewage, Sewage Aeration, Selection and Maintenance of Mechanical Sewage Equipment—and so on. There was a symposium on Small Sewerage Systems and Treatment Plants.

#### PERSONALS

H. GRADY CALLISON, M.D., member A.P.H.A., has been elected Commissioner of Health of Richmond County, Ga., with department of health headquarters at Augusta. He succeeds Dr. Eugene E. Murphey, member A.P.H.A., who has retired. Dr. Callison had been Deputy Commissioner of Health for a year, having formerly been Health Officer of Newberry County, S. Car.

DR. ANTHONY J. LANZA, F.A.P.H.A., spoke on "Silicosis in the United States" at a meeting on silicosis held in Chicago June 12, under the auspices of the industrial committee of the Chicago Tuberculosis Institute.

DR. JOHN H. GRAVES, member A.P.H.A., President of the California State Board of Health, was recently appointed medical director of the California State Industrial Accident Commission and State Compensation Insurance Fund.

DR. ADDISON W. PRESTON, of Visalia, has resigned as Health Officer of Tulare County, Calif., after 25 years' service.

DR. RAY C. ATKINSON has been appointed Health Officer of Colfax, Calif., succeeding Dr. David M. Kindopp.

DR. GARLAND H. PAGE, of Salt Lake City, Utah, member A.P.H.A., has been appointed Superintendent of the Utah State Hospital, at Provo.

DR. OSWALD T. AVERY, of New York, member A.P.H.A., has been named President of the American Association of Pathologists and Bacteriologists.

RICHARD A. BOLT, M.D., F.A.P.H.A., has been appointed by the United States State Department as a delegate to the Sixth English-Speaking Conference on Maternity and Child Welfare, to be held in London July 5-7, and also to the Congrès International pour la Protection de l'Enfance in Paris immediately following. Dr. Bolt is making a study of maternal and child welfare conditions in Germany and Austria, as a result of a recent award of the Oberlaender Trust.

DR. JOHN H. HAMILTON, F.A.P.H.A., was recently appointed Director of the North Carolina State Laboratory of Hygiene, at Raleigh, N. C. He succeeds the late Dr. C. A. Shore.

#### CONFERENCES

June 28-July 3, International Hospital Congress, Knocke-sur-Mer, Belgium.

July 1-7, National Education Association, Chicago.

July 3-7, Association for Childhood Education, Denver, Colo.

July 3-8, British Social Hygiene Council Imperial Congress, London.

July 4, Meeting of the Department of Lip Reading of the National Education Association, Chicago, Ill.

July 5-7, Sixth English-Speaking Conference on Maternity and Child Welfare, London.

July 5-9, International Union of the Protection of Childhood, Paris.

July 10-15, International Council of Nurses, Paris, July 10-12; Brussels, July 13-15.

July 18-20, International Congress of Pediatrics, London.

July 19-22, International Society of Orthopaedic Surgery, London.

July 25-29, British Medical Association, Dublin.

July 29-August 4, World Federation of Education Associations, Dublin.

August, World Federation of Education Associations, Dublin.

September 27-28, Second European Reunion on Mental Hygiene, Rome.

November, 7th American Scientific Congress, Mexico City.

Spring, 1934, Statistical Conference, International Statistical Institute, London.

*Kellogg's*  
**ALL-BRAN**  
RELIEVES  
CONSTIPATION

### Do You Want A Dictionary?

The A. P. H. A. Book Service offers for sale a new copy of Webster's New International Dictionary of the English Language, at a special discount of 25 per cent. 2700 pp., 6000 illustrations, published 1931 (G. & C. Merriam Co., Springfield, Mass.); list price \$17.00, Book Service price \$12.75.

Order from

American Public Health Association  
450 Seventh Avenue, New York, N. Y.

## CANADIAN PUBLIC HEALTH JOURNAL

*Owned and Published by*  
**CANADIAN PUBLIC HEALTH ASSOCIATION**

- (a) Considerations of Nutrition in Relief Work  
(four papers)
- (b) The Pathology of Measles Encephalitis
- (c) The Annual Report of the Medical Officer of Health
- (d) The Public Health Nurse
- (e) Examination of Pathological Material Removed at Operation

THE PAPERS THAT APPEARED IN THE MAY ISSUE

*Subscription \$2.50 per year in the United States*

*For Sample Copies and Information, Write*

**CANADIAN PUBLIC HEALTH ASSOCIATION**  
105 Bond Street Toronto 2, Ontario

# Positions Wanted

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 450 Seventh Avenue, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

## BACTERIOLOGISTS

Bacteriologist, with fourteen years' experience as assistant director of state public health laboratories, desires an immediate position either in public health, commercial work, or teaching. Has had experience in teaching and public health education. L.L. 540

Bacteriologist, M.S. in Bacteriology and Clinical Diagnosis, University of Washington, Seattle; laboratory experience in private clinical laboratory, State Health Department laboratory, hospital laboratory and in milk research with the U. S. Public Health Service. Available now. 65

Young man desires position as director of laboratory or teaching bacteriology; Ph.D., Cornell University, 1924; teaching experience at Cornell, '17-'24, at Harvard, '24-'26; considerable experience as technician, chemist and director of hospital laboratory. Available now. 66

Young woman, nurse's training, Düsseldorf, Germany; laboratory and X-ray course, North West Institute, Minneapolis; one and one-half years' experience in large city health department, desires position, preferably in the South. 67

## HEALTH OFFICERS

Physician desires position as director of health in a city or rural district. Four years' special training at Beirut, Syria, and a course at New York University; four years' experience as County Health Officer. Available now. 68

Young man, M.D., University of Louisville; C.P.H., Johns Hopkins; desires position as City or County Health Officer; one year's experience with county Health Department and three years' experience as city Health Officer. Available now. 69

Physician, M.D., Northwestern University, special course in business administration, desires position as city Health

Officer. Served as industrial physician in steel company; has had two years' experience as city Health Officer. Prefers West or South. Available on six weeks' notice. 70

Physician, graduate of Class A medical college, desires position in public health work. Has had eight years' experience in city and rural health work and sanitation. Available, with reasonable notice, at any time. H.M.B. 72

## SANITARY ENGINEER

Young man, S.B. in Sanitary Engineering, Massachusetts Institute of Technology; graduate work, University of Arizona in physiology, advanced bacteriology and organic chemistry; Assistant Water Superintendent and Engineer for a local Health Department and considerable experience as civil engineer on road and dam construction. 71

## MEDICAL BUREAU

The Medical Bureau has available class A physicians, dentists, graduate nurses and laboratory workers who have specialized in public health work. All credentials have been thoroughly investigated. Those in need of such personnel may receive complete biographies including statements regarding candidates' ability, integrity, and responsibility. No charge to employers for the introduction of applicants. M. Burnice Larson, Director, The Medical Bureau, Pittsfield Building, Chicago.

## POSITIONS AVAILABLE

The next examination for Registered Pharmacists to be conducted by the New Jersey Board of Pharmacy will be held at the State House, Trenton, N. J., Thursday, October 19, 1933. Applicants for this examination must have all papers on file not later than September 19, 1933. Requests for application blanks should be sent to the Board of Pharmacy, State of New Jersey, 28 West State Street, Trenton, N. J.



# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

August, 1933

Number 8

## Loss of Actinic Sunshine as a Health Problem of Cities\*

FRED O. TONNEY, M.D., F.A.P.H.A.

*Director, Technical Service and Research, Chicago Board of Health, Chicago, Ill.*

IN the light of advances during the past few decades, it is becoming increasingly evident that progress in the prevention of air pollution has not kept pace with other public health problems, which but a few years ago lay before the engineering profession. Control of air pollution is still an acute problem of cities, in sharp contrast to its companion projects of water and milk protection, which are now no longer problems, but actualities of accomplishment.

Perhaps the reason for this has been that the pollution of the air by products of combustion has been treated primarily as of economic and esthetic concern, rather than as a basic health problem. It is true that the irritating properties of smoke upon the respiratory membranes and the accumulation of soot in the lungs of the urban dweller have been recited at length as arguments against air pollution; but they have not been sufficiently convincing to bring about a satisfactory solution.

More recently, studies of the loss of actinic sunshine in its passage through the smoke filled atmosphere of cities, have shown a decided and prolonged loss of the ultra-violet light component so necessary to growth of the young and to maintenance of the normal calcium balance of the body.<sup>1, 2, 3</sup>

The significance of this loss from a health aspect is in need of evaluation and calls for a review of the physiologic needs of the body in respect to ultra-violet light or its dietary equivalent, vitamin D, and for a more general realization of the effects upon health which follow as a result of prolonged lack or insufficient absorption of this important form of vital energy.

The obscuring effect of smoke acts to reduce the intensity of the anti-rachitic and erythematous rays, especially in the winter, but does not always occlude them entirely.

Experiments on rats in New York,<sup>4</sup> in Toronto,<sup>5</sup> and in the outskirts of Washington, D. C.,<sup>6</sup> and on chickens in Boston,<sup>7</sup> indicate the presence of weak antirachitic rays in winter sunshine of those localities, sufficient to protect these animals in all-day ex-

---

Read before a Joint Session of the Public Health Engineering and Industrial Hygiene Sections of the American Public Health Association, at its Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

posures. However, attempts to protect babies<sup>8, 9, 10</sup> from rickets solely by means of winter sunshine, administered both directly and through semitransparent windows, have yielded conflicting results and have been on the whole disappointing, in so far as they are applicable to babies under ordinary living conditions.<sup>11</sup> Skyshine<sup>10</sup> as an antirachitic agent during the winter of the temperate zones has proved to be ineffective. Furthermore, recent studies of the solar actinic rays in Chicago, as determined by spectrographic and actinic methods, show that the erythematous and antirachitic rays in the range below 308 mμ. (3080 Ångström units), which are occasionally demonstrable by the spectograph in winter sunshine, are of extremely low actinic intensity.<sup>12</sup>

#### DERANGEMENT OF THE CALCIUM METABOLISM

Gamble says regarding rickets: "No other disease is nearly as prevalent during the first two years of life."<sup>13</sup> Holt and Howland also regard rickets as "probably the most prevalent disease of infants, at least in the cities."<sup>14</sup>

*Climate and Season*—Rickets is primarily a disease of the temperate zones and is far more common in cities than in the surrounding rural districts. It occurs chiefly in the winter and late spring, and virtually disappears during the summer. The disease is rare in tropical regions where sunshine is of good actinic quality the year around, and also in polar regions where the solar ultra-violet light deficiency is offset by general use of raw fish oils in the diet.<sup>15</sup>

Hess and Lundagen report that both normal and rachitic babies in New York<sup>16</sup> show a seasonal tide of calcium and phosphorus in the blood—from a normal in summer of 11 mg. of calcium and about 5 mg. of phosphorus, to a low ebb in March of 9 mg. of calcium and

3.6 mg. of phosphorus per 100 c.c. of blood. Similar findings have been observed in Germany<sup>17</sup> and in New Orleans.<sup>18</sup> Older children in New York also exhibited this ebb and flow of minerals in the blood during the period of low and high actinic quality of sunshine.<sup>16</sup>

*Utilization of Calcium*—The physiological effect of ultra-violet light is apparently exerted by absorption into the skin, principally through the agency of ergosterol, by which it is converted into a catalytic principle, vitamin D. This principle circulates in the blood and is also stored in certain organs, such as the liver and glandular tissues.

Deficiency of vitamin D in the body expresses itself as failure to absorb and utilize the lime and phosphorus of the food, with resulting want of lime in the tissues. In the blood, the deficiency is recorded as low blood phosphorus rather than as decidedly low blood calcium.<sup>19</sup> The phosphorus appears to be essential to lime retention, since, without it, the lime is largely excreted unused, while the body continues to suffer from want of lime.

Lime is deposited in the bony structures mainly as the insoluble tricalcium phosphate. It is absorbed from the intestines and circulates in the blood in the more soluble forms, such as calcium bicarbonate and calcium acid phosphate.<sup>19</sup>

Interesting speculation on the mechanism of absorption of lime salts from the food has been inspired by the work of Yoder,<sup>20</sup> Bacharach and Jephcott,<sup>21</sup> and others, who report that in rickets the bowel contents are relatively alkaline and ultra-violet light or vitamin D lowers the pH, rendering the intestinal contents more acid. The greater solubility of lime salts in an acid medium is well recognized. This premise is in need of further substantiation, but for the present there is no

better hypothesis to explain the observed effects of vitamin D on lime absorption.

#### PHYSIOLOGICAL NEEDS

The needs of the body for lime salts may be classified conveniently as: (1) Those of the periods of heavy calcium demand, namely, (a) growth, (b) expectant motherhood, (c) lactation; (2) those of tooth development and preservation; (3) those concerned with the resistance of the body to bacterial invasion.

*Growth*—The excessive demands of the infant and growing child for lime, to make bones and teeth and maintain bodily health, are scarcely in need of reiteration, beyond the too little realized fact that rickets is still widely prevalent. The disease is of a milder form, however, than a few years ago, due in a measure to partial correction of the solar deficiency by use of cod liver oil, irradiated foods, and artificial ultra-violet light.

The prevalence of rickets in groups of children in various cities has been reported as 96 per cent in New Haven,<sup>22</sup> 25 per cent in New York,<sup>23</sup> 95 per cent in Boston,<sup>24</sup> and 19 per cent in Pittsburgh. In Chicago, during 1931, 16 per cent of the children of preschool age examined routinely were found to present visible evidences of rickets.

Daniels and Hutton<sup>25</sup> conclude from an extensive series of "calcium balance" tests on children, that "infants should retain 40 to 50 mg. of calcium and 20 to 25 mg. of phosphorus per kilogram of body weight."

*Expectant Motherhood*—The needs of the expectant mother, to meet the calcium requirements of the growing fetus for bone and tooth formation, seemingly have not been fully appreciated. Calcium balance experiments on expectant mothers, in different parts of the world, have thrown interesting light on this need.

Coons of the University of Chicago,<sup>26</sup> in a study of 9 expectant mothers, found that 6 were suffering from a "negative calcium balance," that is, were not absorbing from their food and retaining the additional lime needed by the developing babies. This was true more generally in the overcast season of the year. The corollary is that lime from the mother's own bones and teeth were being drawn upon to supply the baby's needs. Further evidence of this appeared in the clinical condition of the mothers, and in at least one of the infants born in a "pre-rachitic" state.

Similar experiments during the prenatal period, by Hoffstrom,<sup>27</sup> Landsberg,<sup>28</sup> Macy, Hunscher, et al.,<sup>29</sup> have also clearly established the excessive calcium demands of pregnancy.

A striking demonstration of the need of expectant mothers for lime and phosphorus is reported by Kathleen Vaughan.<sup>30</sup> Under a religious custom as practiced in India, girls of the upper classes are kept shut in out of the sunlight from an early age until some time after marriage. They live in darkened houses, though there often are inner courtyards, and are not allowed to go out unless heavily veiled. They have no exercise. During pregnancy these women develop a severe form of bone softening known as osteomalacia, due to their failure to absorb sufficient lime and phosphorus from their food to meet the excessive demands of the prenatal state.

The symptoms are severe, "boring" pains in the bony ring of the pelvis and in the ribs, a peculiar waddling gait and inability to climb stairs due to flattening of the softened pelvic bones, crumbling teeth, tetany or convulsions due to calcium deficiency, and occasionally spontaneous fracture of the long bones. Many die in childbirth, being weakened, deformed, and extremely susceptible to the natal infections.

In contrast to these women of the

higher castes, are the "boat women" of the poorer classes who live and work out-of-doors with the men. They are fine physical specimens, and during pregnancy give no evidence of calcium deficiency, or any of its distressing symptoms. Being continually out-of-doors in the sunlight, they are able to absorb the needed lime and phosphorus from their food, whereas their presumably more fortunate sisters of the Purdah system are unable to do so.

Tests on animals show quite definitely that pregnancy increases the normal calcium demand and often brings about a condition of "negative calcium balance," in which lime from the mother's body must go to supply the needs of the fetus.<sup>31, 32</sup>

In Breslau, a study of some 350 expectant mothers was recently reported by Freund and Schmitt,<sup>33</sup> indicating that the use of artificial ultra-violet light greatly improved the calcium metabolism of the expectant mothers, and was reflected in larger, stronger babies at term, with less rickets afterwards.

*Lactation*—Lactation is another function of maternity which throws a heavy demand for calcium upon the mother's body and greatly increases her need of actinic sunshine, or its equivalent from artificial sources or in the diet.

Prior to the birth of the offspring, the normal mother stores great quantities of lime to be used for secreting milk. This excessive calcium demand continues during the entire lactating period. Here again, ultra-violet light and vitamin D play an essential part in abstracting the needed lime from the food. Deficiency of ultra-violet light or vitamin D in these mothers reduces the retention of lime, and necessitates the disintegration of the lime-bearing structures of the mother's body to supply the needed minerals for milk production. At times, this source fails after a period, and the milk becomes of poor quality.<sup>29</sup>

*The Teeth*—The needs of the teeth for lime salts, both for initial growth and for protection from decay, are another little appreciated public health problem. The researches of Mellanby and others have shown an extremely high prevalence of defective first or temporary teeth of rachitic type in the children of England, and an almost equal degree of defectiveness of the permanent teeth.<sup>34</sup> Microscopic studies of the teeth of rachitic puppies showed a lack of lime in the layers of tooth substance laid down during deficiency of ultra-violet light and vitamin D.<sup>35</sup> Furthermore, when the deficiency was corrected, only the new layers of dentine received the normal quota of lime, leaving the older layers still deficient. The vacuoles, or openings, in such defective teeth are called "interglobular spaces," and it is noted in microscopic examination of decaying teeth that the decay begins in these spaces and defective areas and extends thence into the surrounding tooth structure.<sup>34</sup>

*Resistance to Bacterial Invasion*—The lime requirements of the body, for resistance to bacterial invasion, are little understood. The mechanism by which protective substances are formed in the blood is still subject to speculation, the theory that the normal alkaline reserve of the blood plays the star rôle, running ahead of most others.

The clinical fact is that children and adults with disturbed calcium metabolism are an easier prey to bacterial infection than are normal persons. Rachitic children, as a group, acquire the ailments of childhood more easily and have a higher fatality rate from these infections, than do normal children.<sup>36</sup> The same is true of experimental animals.<sup>37</sup> The Purdah mothers of India, previously referred to, are especially susceptible to infection during labor, according to reports of obstetricians attending them.

In further confirmation of these facts are the respiratory death rates in the larger cities, which have a seasonal ebb and flow, quite comparable to that of the blood calcium and phosphorus of babies and children, reaching a peak in March, at the end of the low actinic period, and falling from that time on, to the minimum in June, July and August.<sup>38</sup>

In Montreal, studies of the seasonal incidence of contagion by Cushing led to the belief that the stronger actinic sunshine of these months in some way acted to bring contagion to a low ebb.<sup>39</sup>

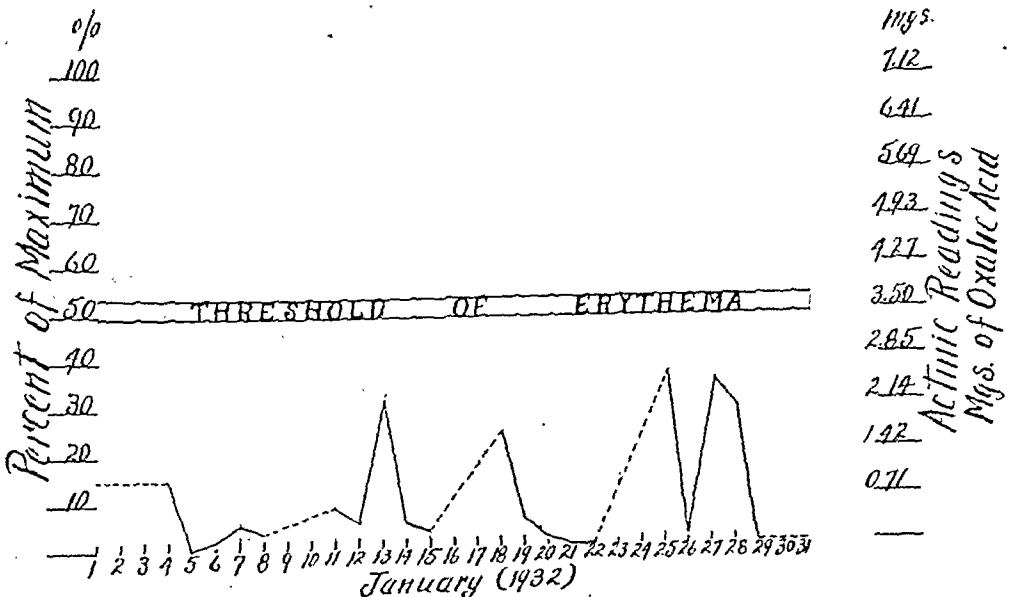
Maughan and Smiley, in studies of the incidence of the common cold among the students of Cornell University over several years, came to the conclusion that ultra-violet light deficiency was a factor in predisposition to these infections in "cold susceptible" persons.<sup>40</sup>

#### THE REMEDY

This, then, is our public health problem, dealing with the calcium derangement of a significant part of the urban population, due in the last analysis to deficiency of actinic sunshine during a considerable portion of the year. The normal seasonal duration of deficient sunshine of perhaps 2 or 3 months, appears to have been at least partly provided against in nature's plan, by storage of vitamin D in the tissues of the body. The prolongation of this seasonal low period by 2 to 4 additional months, due to occlusion of actinic sunshine by smoke, is probably a factor in bringing about the unfavorable physiological reactions of calcium unbalance. Such a conclusion seems reasonable, since evidences of calcium derangement are far less prevalent in rural than in urban districts. As to specific remedies, we suggest:

FIGURE I

*Daily Variation of Ultraviolet Light Indicated by Actinic Measurements for the Hour 12-1 PM*



1. Climatic surveys of cities to determine: (a) the normal seasonal actinic deficiency. This can perhaps be most simply accomplished by measuring the angle of incidence of the sun's rays at noon<sup>41</sup> and recording the number of months of the year in which it is below 35° from the horizontal; (b) determination of the actinic loss of sunshine due to smoke, which is estimated by comparison of simultaneous readings in urban and nearby rural testing points. For this purpose there are available the simpler actinic methods<sup>42, 43, 44</sup> and the portable spectrographic method<sup>12</sup> now developed to a practical stage for field work.

2. Education of urban populations in the health value of the out-of-doors, with specific information on the local daily actinic value of sunshine, Figures I and II, the hourly variation according to the season, and the minimal erythral time for untanned skin, the latter of which can be easily determined by the device shown in Figure III.

3. Provision of substitutes for actinic sunshine, such as ultra-violet lamps in infant welfare centers and free distribution of cod liver oil or vitamin D foods during the prolonged overcast season. Cincinnati,<sup>45</sup> Pittsburgh, and Chicago have been using some of these measures.

But in all such attempts to meet an acute human need, are we not begging the question? Did the warning to "boil the water" really go far to prevent typhoid fever, while unsafe water continued to flow into city mains? Did the advice to boil the milk really check the conveyance of bovine tuberculosis in a significant way, while pasteurizing plants and tuberculin testing of herds were still remote and visionary projects?

We know they did not. There is ever a substantial number of persons who disregard advice, who cannot afford treatment, who neglect to follow a precautionary program consistently. What we need most is pure water for *all*—the unthinking as well as the informed; safe milk for *all*; clean air; and the full actinic value of sunshine at all seasons of the year for the *entire* population.

We must turn for our remedy to the public health engineer. We can now

FIGURE II

*Daily Variation of Ultraviolet Light Indicated by Actinic Measurements for the Hour 12-1 PM*

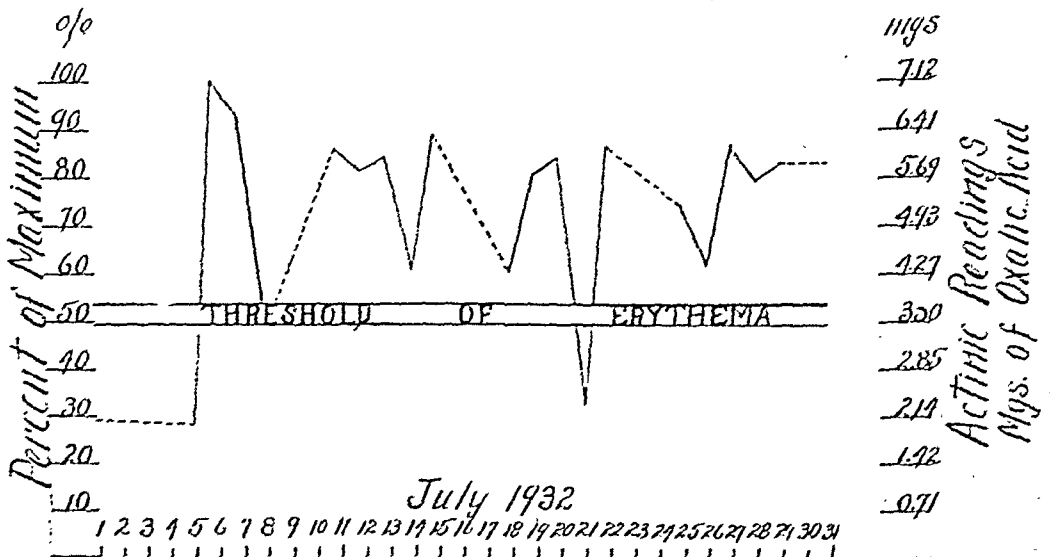


FIGURE III  
DEVICE TO RECORD ERYTHEMAL TIME



The child is placed in direct sunshine for 40 to 50 minutes, with shoulders covered by cloth.

Each of the openings in the opaque strip is covered successively at 5 minute intervals with a paper sticker—beginning at the left.

Thus, a series of exposures of 5 minutes, 10 minutes, 15 minutes, etc., up to the maximum, is made. After 12 hours, the erythema spots are counted from the right, back to the last visible mark. This number, subtracted from the total number of openings exposed, and then multiplied by five, gives the minimal erythema time.

In Chicago, during June, the mean erythema time was 20 minutes—in both children and adults.

offer a health motive for the clearing of the skies, a motive as fundamental and far reaching as those that have brought about the control of water-borne and milk-borne disease. Our children mean much to us—as do our mothers and mothers-to-be. Do they mean enough to spur the correction of imperfect and wasteful methods of combustion?

There are certain trends of heating practice springing up here and there which seem to point the way. The central steam heating plant to burn coal and oil in congested centers is now successfully competing with individual heating plants, driving the smaller heating units out of use. One can see this development now in process of evolution in the business section of Kansas City, Mo., with a noticeable effect upon

air conditions. Do not the same economic principles apply to cities everywhere, and on a larger scale?

Should government go into the business of providing heat for its populations without pollution of the air, in great central plants connected by underground pipes to every building in the respective districts? Or is this service a function of private enterprise, profitable on an extended scale, as well as in a limited way?

Should there be underground conduits like the aqueducts and sewers, to carry objectionable fumes of combustion and industrial processes to a common treatment plant or discharge them at a safe distance?

What can be done to increase the use of natural gas for heating and indus-

trial purposes in those centers in which it is available? The combustion products of gas heating do not materially occlude the sunshine.<sup>38</sup>

What is the hope of electric heating in the future, especially where hydro-electric power is within reach, or where coal fields, adjacent to water supplies, are within 200 or 300 miles, near which coal could be burned and converted into current?

#### THE RÔLE OF THE ENGINEER

The ultimate disposal of this newer health problem of air pollution falls to the lot of the public health engineer, just as others have done—problems of equal initial proportions, but which have in the end proved to be more colossal in prospect than in the accomplishment.

The engineering profession has never failed to provide the way, once a definite health dictum has been laid down for its guidance.

#### REFERENCES

1. Bundesen, H. N., Lemon, H. B., Falk, I. S., and Coade, E. N. Ultraviolet Radiation from Sunlight and Incandescent Lamps: Its Transmission through Window Glass and Substitutes. *J.A.M.A.*, 89:187 (July 16), 1927.
2. Schrader, J. H., Coblentz, M. H., and Korff, F. A. Effect of Atmospheric Pollution upon Incidence of Solar Ultraviolet Light. *A.J.P.H.*, 19:717 (July), 1929.
3. Tonney, F. O., Hoeft, G. L., and Somers, P. P. Loss of Actinic Intensity in Urban Sunshine Due to Air Pollution. *J. Prev. Med.*, 4:139 (Mar.), 1930.
4. Eddy, W. H. The Use of Ultraviolet Light Transmitting Windows. *A.J.P.H.*, 18:1470 (Dec.), 1928.
5. Tisdall, F. F., and Brown, A. Seasonal Variation of the Antirachitic Effect of Sunshine. *Am. J. Dis. Child.*, 34:721 (Nov.), 1927.
6. Fleming, W. D. The Antirachitic Efficiency of Winter Sunlight of Washington, D. C. *Mil. Surgeon*, 62:592 (May), 1928.
7. Report on Window Glass Substitutes, Council on Physical Therapy of the American Medical Association. *J.A.M.A.*, 88:1562 (May 14), 1927.
8. Hess, A. F. The Ultraviolet Rays of the Sun. *J.A.M.A.*, 84:1033 (Apr. 4), 1925.
9. Wyman, E. T. The Prevention and Treatment of Rickets. *Boston M. & S. J.*, 197:376 (Sept. 2), 1927.
10. Caldwell, G. W., and Dennett, R. H. The Clinical Value of Sunlight Through Ultraviolet Transmitting Glass. *J.A.M.A.*, 92:2088 (June 22), 1929.
11. Blunt, Catherine, and Cowan, Ruth. *Ultraviolet Light and Vitamin D in Nutrition*. University of Chicago Press, 1930, p. 89.
12. Tonney, F. O., Hoeft, G. L., and DeYoung, F. W. The Relation of Actinic Intensity of Sunshine to Minimal Wave Lengths. *Am. J. Hyg.*, July, 1933.
13. Gamble, James M. *Chemistry in Medicine*. The Chemical Foundation, Inc., 1928, p. 162.
14. Holt, L. Emmett, and Howland, John. *The Diseases of Infancy and Childhood*, Ed. 9. Appleton, 1926, p. 187.
15. Thomas, W. A. Health of a Carnivorous Race: A Study of the Eskimo. *J.A.M.A.*, 88:1559 (May 14), 1927.
16. Hess, A. F., and Lundagen, M. A. A Seasonal Tide of Blood Phosphate in Infants. *J.A.M.A.*, 79:2210 (Dec. 30), 1922.
17. Blunt, Catherine, and Cowan, Ruth. *Ultraviolet Light and Vitamin D in Nutrition*. University of Chicago Press, 1930, p. 36.
18. Williams, C. T. The Infrequency of Severe Rickets in New Orleans and Vicinity. *Am. J. Dis. Child.*, 35:590 (Apr.), 1928.
19. Howland, J., and Kramer, B. Calcium and Phosphorus in the Serum in Relation to Rickets. *Am. J. Dis. Child.*, 22:105 (Aug.), 1921.
20. Yoder, L. Effect of Antirachitic Vitamin on the Phosphorus, Calcium, and pH in the Intestinal Tract. *J. Biol. Chem.*, 74:321 (Aug.), 1927.
21. Bacharach, A. L., and Jephcott, H. Vitamin D and Fecal Reaction. *J. Biol. Chem.*, 82:751 (June), 1929.
22. Eliot, M. M. The Control of Rickets: Preliminary Discussion of the Demonstration in New Haven. *J.A.M.A.*, 85:656 (Aug. 29), 1925.
23. Hess, A. F., and Unger, L. J. Prophylactic Therapy for Rickets in a Negro Community. *J.A.M.A.*, 69:1583 (Nov. 10), 1917.
24. Wyman, E. T., and Weymuller, C. A. The Organization of a Special Clinic for the Treatment of Rickets with the Mercury Vapor Quartz Lamp in an Outpatient Department. *J.A.M.A.*, 83:1479 (Nov. 8), 1924.
25. Daniels, A. L., and Hutton, M. K. Relation of Bone Development in Infants to Calcium and Phosphorus Retention Ratios. *Proc. Soc. Exper. Biol. & Med.*, 25:794 (June), 1928.
26. Coons, C. M., and Blunt, K. The Retention of Nitrogen, Calcium, Phosphorus, and Magnesium by Pregnant Women. *J. Biol. Chem.*, 86:1 (Mar.), 1930.
27. Hoffstrom, K. A. Eine Stoffwechseluntersuchungen Während der Schwangerschaft. *Skandin. Arch. f. Physiol.*, 23:326, 1910.
28. Landsberg, E. Untersuchungen über den stoffwechsel von Stickstoff, Phosphor und Schwefel bei Schwangeren. *Ztschr. f. Geburtsh. u. Gynäk.*, 71:163 (July), 1912.
29. Macy, I. G., Hunscher, H. A., Nims, B., and McCosh, S. S. I. Metabolism of Women During Reproduction Cycle; Calcium and Phosphorus Utilization in Pregnancy. *J. Biol. Chem.*, 86:17 (Mar.), 1930.
30. Vaughan, Kathleen O. *Purdah System and Its Effect on Motherhood: Osteomalacia Caused by Absence of Light in India*. Cambridge: W. Heffer & Sons, Ltd., 1928.
31. Sherman, H. C., and MacLeod, F. L. The Calcium Content of the Body in Relation to Age, Growth and Food. *J. Biol. Chem.*, 64:429 (June), 1925.



32. Hart, E. B., Steenbock, H., and Elvehjem, C. A. Dietary Factors Influencing Calcium Assimilation: V. The Effect of Light upon Calcium and Phosphorus Equilibrium in Mature Lactating Animals. *J. Biol. Chem.*, 62:117 (Nov.), 1924.
- Hart, E. B., Steenbock, H., Elvehjem, C. A., and Scott, H. Dietary Factors Influencing Calcium Assimilation: VII. The Influence of Sunlight upon Calcium Equilibrium in Milking Cows. *Ibid.*, 67:371 (Feb.), 1926.
- Hart, E. B., Steenbock, H., and Scott, H. Dietary Factors Influencing Calcium Assimilation: VIII. The Calcium Level and Sunlight as Affecting Calcium Equilibrium in Milking Cows. *Ibid.*, 71:263 (Jan.), 1927.
- Hart, E. B., Steenbock, H., Kletzien, S. W., and Scott, H. Dietary Factors Influencing Calcium Assimilation: IX. Further Observations on the Influence of Cod Liver Oil on Calcium Assimilation in Lactating Animals. *Ibid.*, 71:271 (Jan.), 1927.
- Hart, E. B., Steenbock, H., Scott, H., and Humphrey, G. C. Dietary Factors Influencing Calcium Assimilation: X. The Influence of Ultraviolet Light upon Calcium and Phosphorus Metabolism in Milking Cows. *Ibid.*, 73:59 (May), 1927.
33. Freund, W., Schmitt, K. Einfluss der Bestrahlung Schwangerer auf die Konstitution der Neugeborenen. *Monatsschr. f. Kinderh.*, 43:424 (June), 1929.
34. Mellanby, M. The Structure of Human Teeth. *Brit. Dent. J.*, 48:737 (July 1), 1927.
- The Relation of Caries to the Structure of Teeth. *Ibid.*, 44:1 (Jan.), 1923.
- The Effect of Diet on the Resistance of Teeth to Caries. *Proc. Roy. Soc. Med.*, 16:74 (Oct.), 1923.
- Mellanby, M., Pattison, C. L., and Proud, J. W. The Effect of Diet on the Development and Extension of Caries in the Teeth of Children. *Brit. M. J.*, 354 (Aug. 30), 1924.
- Mellanby, M., and Pattison, C. L. Some Factors of Diet Influencing the Spread of Caries in Children. *Brit. Dent. J.*, 47:1045 (Oct.), 1926.
- The Action of Vitamin D in Preventing the Spread and Promoting the Arrest of Caries in Children. *Brit. M. J.*, 1079 (Dec. 15), 1928.
35. Mellanby, M. The Influence of Diet on the Structure of Teeth. *Physiol. Rev.*, 8:545 (Oct.), 1928.
- An Experimental Study of the Influence of Diet on Teeth Formation. *Lancet*, 195:767 (Dec. 7), 1918.
- The Effect of Certain Dietetic Factors on the Development of Teeth and Jaws. *Med. Off.*, 25:231, 1921.
- The Value of the Animal Experimental Method in Dental Research. *Dental Rec.*, 42:1, 1922.
36. Brown, A., and Tisdall, F. F. Seasonal Variation of Antirachitic Effect of Sunshine and Its Effect on Resistance to Disease. *Canad. M. A. J.*, 17:1425 (Dec.), 1927.
37. Robertson, E. C. Effect of Various Agents, Chiefly Sunshine, upon Susceptibility of Rachitic Rats to Infection. *Canad. M. A. J.*, 19:154 (Aug.), 1928.
38. Tonney, F. O., and DeYoung, C. R. Smoke Eradication to Save the Health Value of Urban Sunshine. *A.J.P.H.*, 21:344 (Apr.), 1931.
39. Cushing, H. B. Cause and Treatment of Rickets. *Canad. M. A. J.*, 11:766 (Oct.), 1921.
40. Maughan, G. H., and Smiley, D. F. Irradiations from Quartz-Mercury-Vapor Lamp as Factor in Control of Common Colds. *Am. J. Hyg.*, 9:466 (Mar.), 1929.
- Effect of General Irradiation with Ultraviolet Light upon Frequency of Colds. *J. Prev. Med.*, 2:69 (Jan.), 1928.
41. Tisdall, F. F., and Brown, A. Relation of the Altitude of the Sun to its Antirachitic Effect. *J.A.M.A.*, 92:860 (Mar. 16), 1929.
42. Tonney, F. O., Somers, P. P., and Marti, W. C. Actinic Measurement of Solar Ultraviolet Light and Some Correlations with the Erythema Dose. *J. Prev. Med.*, 2:493 (Nov.), 1928.
43. Tonney, F. O., and Somers, P. P. A Practical Method of Measuring Sunshine. *A.J.P.H.*, 19:1039 (Sept.), 1929.
44. Clark, J. H. A Simple Method of Measuring Intensity of Ultraviolet Light with Comparative Results on a Number of Physiological Reactions. *Am. J. Physiol.*, 69:200 (June), 1924.
45. Selkirk, T. K., Greenbaum, J. V., and Mitchell, A. G. Studies in Rickets; Prevention by Means of Ultraviolet Irradiation. *J.A.M.A.*, 91:2057 (Dec. 29), 1928.

## Hats and Stethoscopes

THE influences which bring about the abandonment of time-honored customs are varied and often surprising. An editorial in the British Medical Journal brings out one of the most curious of these.

In England, the top-hat has been for generations the dignified insignia of the physician, and even country doctors, winter and summer, wore it. The medical attendant of the Victorian era considered it the only hat appropriate to his dignity, and we are told that, in addition, he found it a convenient receptacle for his one-piece stethoscope, so much so that Sherlock Holmes would

recognize a doctor's "topper" by the bulge in the crown.

Now this dignified headdress has departed from the medical field, though it is still the professional emblem of stockbrokers, undertakers and bank messengers.

What has brought about the change? It is credited to the motor car chiefly, but partly to the World War. People have gotten used to seeing their family physician in almost any kind of costume. The doctor is certainly to be congratulated on his additional comfort.—*British Medical Journal*, June 3, 1933, page 971.

# Is Malnutrition Increasing?

ESTHER JACOBS

*Executive Secretary, Community Health Center, Philadelphia, Pa.*

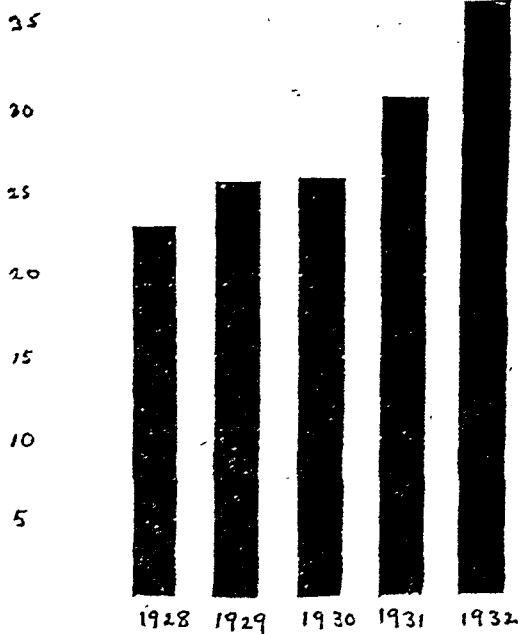
RECOGNIZING the wide variance of opinion with regard to the entire subject of malnutrition, and appreciating that the basis of diagnosis differs with each individual physician, we deem it wise to state at the very beginning that we propose only to show what we have found in studying our diagnoses of malnutrition on clients coming to the Community Health Center diagnostic medical clinics during a five-year period.

The Diagnostic Clinic is only one of the activities of the Community Health Center, which also includes a Dental Clinic, giving complete treatment service; a Mental Hygiene Department, giving both treatment and diagnostic service to a limited number of patients; and a Health Extension Department, which carries on an educational program. The clients are referred by the constituent social agencies in the Federation of Jewish Charities, with the exception of a very small group examined each year for the Mothers' Assistance Fund. Both family and childcare agencies (including day nurseries) are represented. The patients are almost all Jewish. They are a dependent group of individuals, referred for periodic health examinations semi-annually or annually, depending on the age of the client and the referring agency, so that a certain proportion have been coming back at regular intervals over this five-year period. The agency referring the case assumes full responsibility for supervision of the client's health follow-up.

The Community Health Center medical examiners are practicing physicians of experience and standing in the community, who give us clinic periods on a paid hourly basis. The work is under the direction of Dr. Bernard Kohn. The appointment system is followed. Each new patient sent to us is preceded by as complete a medical history as the case worker is able to secure, plus any significant

CHART I

Percent



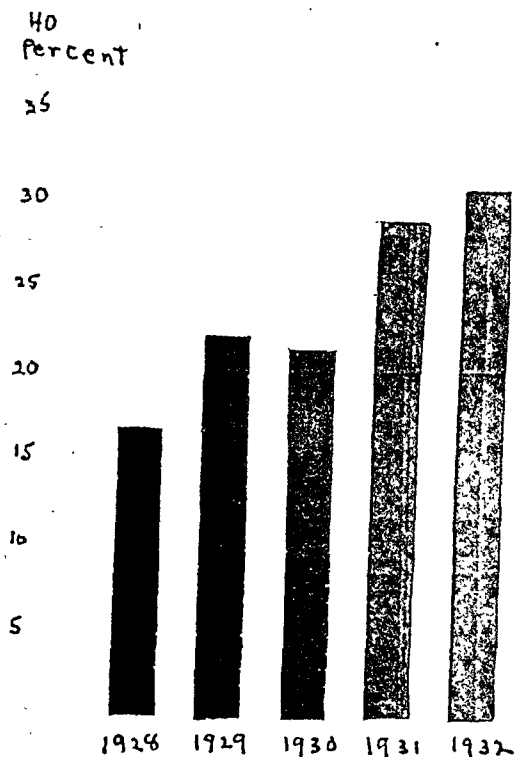
DIAGNOSES OF MALNUTRITION AMONG COMMUNITY HEALTH CENTER PATIENTS, MAY TO OCTOBER, INCLUSIVE, FOR EACH YEAR (IN PERCENTAGES OF TOTAL NUMBER OF PATIENTS)

medical-social data. In the cases of re-examination, medical history is supplemented to bring the medical data up to date.

A report of any treatment that has been secured, either as a result of recommendations previously made by

ings and symptomatology—height, weight, condition of skin and tissues, mucous membrane, musculature, and patient's general physical condition. A staff meeting held just prior to the

CHART II



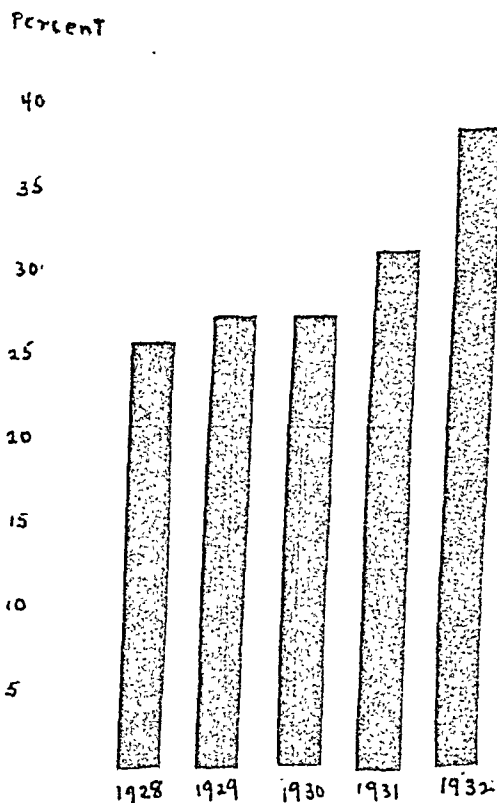
DIAGNOSES OF MALNUTRITION AMONG COMMUNITY HEALTH CENTER PATIENTS, MAY TO OCTOBER, INCLUSIVE, FOR EACH YEAR (IN PERCENTAGES OF TOTAL NUMBER OF NEW CASES \*)

the Community Health Center, or because of some illness which occurred during the interval between examinations, is usually sent to the Community Health Center by the case worker at the time such treatment is completed.

The medical staff based their diagnoses of malnutrition on clinical find-

\* New cases means those patients seen for the first time at the Community Health Center. In this group there has been a very definite increase since 1930. The proportionate increase in malnutrition diagnoses from 1928 to 1932 in the new cases was 82.3 per cent.

CHART III



DIAGNOSES OF MALNUTRITION AMONG COMMUNITY HEALTH CENTER PATIENTS, MAY TO OCTOBER, INCLUSIVE, FOR EACH YEAR (IN PERCENTAGES OF TOTAL NUMBER OF OLD CASES \*)

making of this study brought out general agreement among the physicians as to the diagnosis. Since the staff was materially changed between 1929 and

\* Old cases means those previously known to the Community Health Center and re-examined for the first time in that fiscal year. New cases in 1928 become old cases in 1929, and so on, for each succeeding year. Therefore, although there is no duplication in the data for the individual year, the old cases necessarily are cumulative.

It would seem from this material that the percentage of malnutrition according to Community Health Center diagnoses was higher in old cases than in new. However, the proportionate increase over the five-year period is lower in the old cases.

1930, the same question was put to our former staff members, each of whom stressed the same points in defining the basis for a diagnosis of malnutrition.

The study covered the five-year period, 1928 to 1932, taking all individuals examined during the first six months of the fiscal year, May to October inclusive, which brought the material practically up to date. The data are shown in the following table.

diagnosis above what they would ordinarily have been; also, the staff of physicians was slightly different during 1928 and 1929 than during 1930, 1931, and 1932. However, as previously stated, the individual examiners agree that their basis of diagnosis is the same, and this would seem to be more or less borne out by the fact that there is no startling difference between 1929 and 1930, which might

DIAGNOSES OF MALNUTRITION IN INDIVIDUALS EXAMINED AT COMMUNITY HEALTH CENTER  
MAY TO OCTOBER (INCLUSIVE)—1928—1929—1930—1931—1932.

	1928			1929			1930			1931			1932		
	Indi-vid-u-als Ex-am'd	Mal-nu-tri-tion	% with Mal-nu-tri-tion	Indi-vid-u-als Ex-am'd	Mal-nu-tri-tion	% with Mal-nu-tri-tion	Indi-vid-u-als Ex-am'd	Mal-nu-tri-tion	% with Mal-nu-tri-tion	Indi-vid-u-als Ex-am'd	Mal-nu-tri-tion	% with Mal-nu-tri-tion	Indi-vid-u-als Ex-am'd	Mal-nu-tri-tion	% with Mal-nu-tri-tion
<b>NEW</b>															
Under 6	177	20	11.3	157	18	11.4	107	12	11.2	111	23	20.7	98	16	16.3
6 to 12	189	51	27.4	216	56	25.9	142	37	26.2	173	64	37.0	193	72	37.3
13 to 16	84	16	19.0	82	23	28.0	68	18	26.4	51	22	43.1	92	36	39.1
17 to 20	29	2	6.9	41	6	14.6	9	3	33.3	15	2	13.3	16	3	18.7
Over 20	230	32	13.9	232	60	25.8	136	30	22.0	121	27	22.3	144	42	29.2
<b>TOTAL NEW</b>	709	121	17.0	728	163	22.3	462	100	21.6	471	138	29.3	543	169	31.0
<b>OLD</b>															
Under 6	200	23	11.5	196	24	12.2	161	18	11.1	149	20	13.4	124	35	28.2
6 to 12	600	190	31.6	675	216	32.0	623	178	28.5	616	217	35.2	543	234	43.0
13 to 16	310	96	30.9	280	84	30.0	278	91	32.7	281	102	36.3	291	127	43.6
17 to 20	84	29	34.5	83	32	38.5	53	26	49.0	58	18	31.0	62	22	35.4
Over 20	227	31	13.6	268	55	20.5	194	49	25.2	149	37	24.8	125	29	23.2
<b>TOTAL OLD</b>	1,421	369	25.9	1,502	411	27.3	1,309	362	27.6	1,253	394	31.4	1,145	447	39.0
<b>TOTALS</b>															
Under 6	377	43	11.4	353	42	11.9	268	30	11.1	260	43	16.5	222	51	22.9
6 to 12	789	241	30.5	891	272	30.5	765	215	28.1	789	281	35.6	736	306	41.5
13 to 16	394	112	28.4	362	107	29.5	346	109	31.5	332	124	37.3	383	163	42.5
17 to 20	113	31	27.4	124	38	30.6	62	29	46.7	73	20	27.4	78	25	32.0
Over 20	457	63	13.7	500	115	23.0	330	79	23.9	270	64	23.7	269	71	26.3
<b>GRAND TOTALS</b>	2,130	490	23.0	2,230	574	25.7	1,771	462	26.0	1,724	532	30.8	1,688	616	36.5

There has been a gradual increase in malnutrition diagnoses from 23 per cent in 1928 to 36.5 per cent in 1932, or a proportionate increase for all cases of 56.5 per cent.

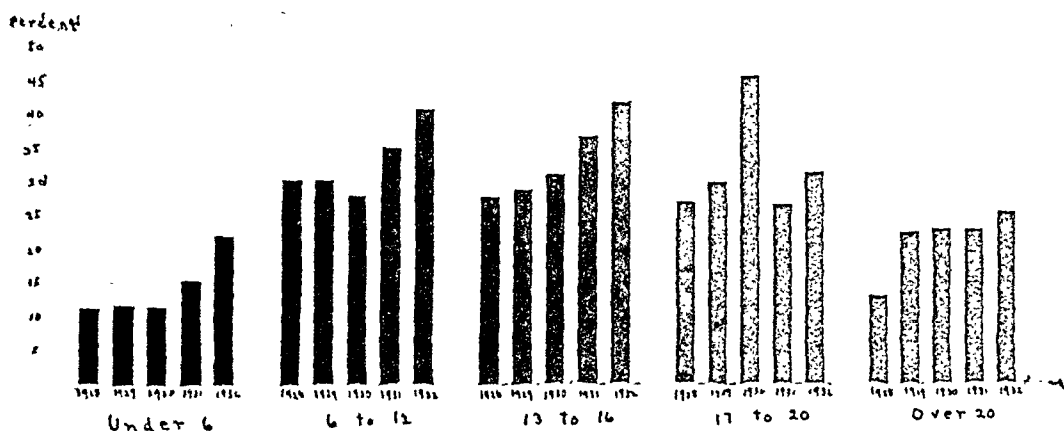
During 1928 and 1929 a nutrition worker on the staff may have made the physicians more nutrition conscious during those years, and may have possibly increased the malnutrition

be expected with a change in examiners.

Among the old cases returning to the Health Center regularly over a period of years are a large group from broken homes. Just what part poor heredity and what part the emotional factors play in these cases where malnutrition persists must undoubtedly be considered in the problem as a whole.

In addition to the age division as

CHART IV



DIAGNOSES OF MALNUTRITION AMONG COMMUNITY HEALTH CENTER PATIENTS—MAY TO OCTOBER, INCLUSIVE, FOR EACH YEAR (IN PERCENTAGES ACCORDING TO DIFFERENT AGE GROUPS)

presented in Chart IV, we also classified the groups according to sex, but found only a slight variation in that respect.

It seems important to emphasize the gradual upward trend over the entire period, rather than the percentage in any one group at any particular time. However, from the study it would seem that the more serious problem here definitely centers about the six to sixteen year old group. The rather erratic up-and-down curve in the seventeen to twenty year group is probably explained on the basis of the very small number of individuals in each subdivision in that particular age group; while in the group over twenty the fact that lack of adequate or proper diet does not develop symptoms as quickly as in children would affect the total picture and make it less spectacular, though probably just as serious in terms of future well-being.

Is there not some significance, and should we not be concerned, in such an increasing number of malnutrition diagnoses, and the possible causative factors? Is it due to physical defects and poor heredity, or, has the depression, with its lowered standards of living—involving inadequate food budgets and overcrowded living condi-

tions—been largely responsible? In either case can we lose sight of the possible effect of the emotional element as a cause in malnutrition? The insecurities and conflicts which arise when unemployment strikes at the very foundations of family life surely might conceivably be a very basic cause and one not so amenable to treatment.

From many sources we hear how the health of the nation has been main-

DIAGNOSES OF MALNUTRITION IN OLD CASES EXAMINED AT COMMUNITY HEALTH CENTER, MAY TO OCTOBER (INCLUSIVE) 1928—1929—1930—1931—1932.

Year	Total Number of Old Cases	NEW Malnutrition on OLD Cases		PERSISTING Malnutrition on OLD Cases	
		Indi-vid-u-als	Per-cent-age	Indi-vid-u-als	Per-cent-age
1928	1421	81	5.7	288	20.2
1929	1502	111	7.3	300	19.9
1930	1309	66	5.	296	22.6
1931	1253	75	5.9	319	25.4
1932	1145	127	11.1	320	27.9

tained at a high level, and this is most encouraging when one realizes the fundamental part the public health movement has had in bringing it about. Such proof, particularly at this time when budgets of health activities are being so drastically reduced, is especially needed and helpful and must not be minimized. However, in his presidential address before the American Public Health Association last October, Dr. Louis I. Dublin, in stressing the favorable health condition throughout the country, injected this thought: "I should, however, point out that our records throw no light on the mental health of the people, which must be anything but good. Nor can I avoid the fear that, should present conditions

continue, we will soon become aware of the consequences of malnutrition of children in terms of disease and mortality records."

How serious the inroads upon the general health have been during this period of depression, and what eventually will be the cost to communities in the future, one can only speculate at this time. Health activities must continue, and more than ever before we must think and plan in terms of positive health. Mental hygiene, periodic health examinations, dental care, correction of physical defects, carefully planned and well-rounded food budgets, must all play a large part in our health programs if we are to safeguard our future generations of children.

---

## The Physician's Prayer

ME also Thine eternal providence hath chosen to watch over the life and health of Thy creatures. I am about to begin the exercise of my profession.

Aid me, O All-kind One, in this great work, so that it may be of avail, for without Thine assistance nothing succeeds, not even the least.

May the love of my fellow-man and of my art ensoul me. May not thirst for gain nor craving for fame mingle in my service, for these are enemies of truth and charity, and they might mislead me, and keep me from doing what I ought to do for the weal of my fellow-men. . . .

If wiser men wish to teach and correct me, may I follow them and be

grateful; for the compass of our art is large and wide. But if zealous fools upbraid me, then let the love of my art keep me strong, so that I may adhere to truth without regard to years and fame; for weakness and yielding would involve the pain and even the death of Thy creatures. . . .

Give me frugality beyond all, except in the great art. May never awaken in me the notion that I know enough! Oh give me strength and leisure and zeal to enlarge my knowledge, and to attain ever to more. Our art is great, and the mind of man presses forward for ever.—Extracts from *The Physician's Prayer* (Maimonides), *The Canadian Medical Association Journal*, January, 1931, page 2.

# Seasonal Distribution of Whooping Cough for Periods of High and Low Incidence\*

G. E. HARMON, M.D., F.A.P.H.A.

*Department of Hygiene and Bacteriology, School of Medicine,  
Western Reserve University, Cleveland, Ohio*

THE present study undertakes to compare the seasonal distribution of whooping cough during periods of high and low incidence. The data utilized are those which have been described and evaluated in a previous paper,<sup>1</sup> namely, the reported monthly incidence of whooping cough for various states of the United States as published in *Public Health Reports*. The years 1922-1931, inclusive, are considered. A time series composed of the number of cases of whooping cough reported in successive months, adjusted throughout to a month of 31 days, was set up for each of 29 states. These adjusted time series constitute the basic data of this study.

The first problem is that of defining a period of high incidence and a period of low incidence. Each time series, running from October 1, 1922, to September 30, 1931, includes 9 epidemiological years. As a first attempt the year of maximum incidence was considered a high period. The results of an analysis carried out upon this basis were not satisfactory because of irregular fluctuations due apparently to small numbers. Greater stability was necessary in order to get reasonably

smooth seasonal curves. To secure this, the 3 years of greatest incidence were considered a high period and the 3 years of lowest incidence a low period. In reality, the percentage monthly distribution of the combined cases for each 3-year period represents the seasonal distribution of a mean year of high and low prevalence respectively.

To obtain the percentage seasonal distribution for all states, two methods were tried. Method I involved the combination of the various individual time series. In other words, the 29 states were regarded as a morbidity registration area. The 3 years of highest incidence were picked out from the composite time series thus derived. Then the figures representing the corresponding monthly incidence for the selected years were added together. Method II involved (a) picking out the 3 years of highest incidence from the time series of an individual state first. Then (b) the figures representing the corresponding monthly incidence for the selected years were added together. The monthly figures thus obtained for each of 29 states were similarly added together to get a composite picture of distribution of cases by months for all states considered as a whole. Finally, in both methods the combined cases for each month were expressed as a per-

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

centage of the grand total for the high period. Percentage seasonal distributions of cases for a period of low incidence were obtained by applying these methods.

In using Method I it is probable, since the epidemic cycles of the various states do not vary together, that high and low years are combined and the effects of either averaged out. With Method II the calendar years selected for either period respectively are not the same for the various states. For all states, however, the years selected for each period do in a sense represent

corresponding positions on their epidemic cycles.

The results obtained by applying these methods are set forth in Table I and Graph I. A study of these indicates that during a high period, as here defined, the seasonal distribution of whooping cough tends to exhibit a greater amplitude and an earlier peak than during the low period. The question naturally arises as to whether this result may not be due to the weight exerted by a few large states. This possibility was investigated as follows: After applying the first two steps of

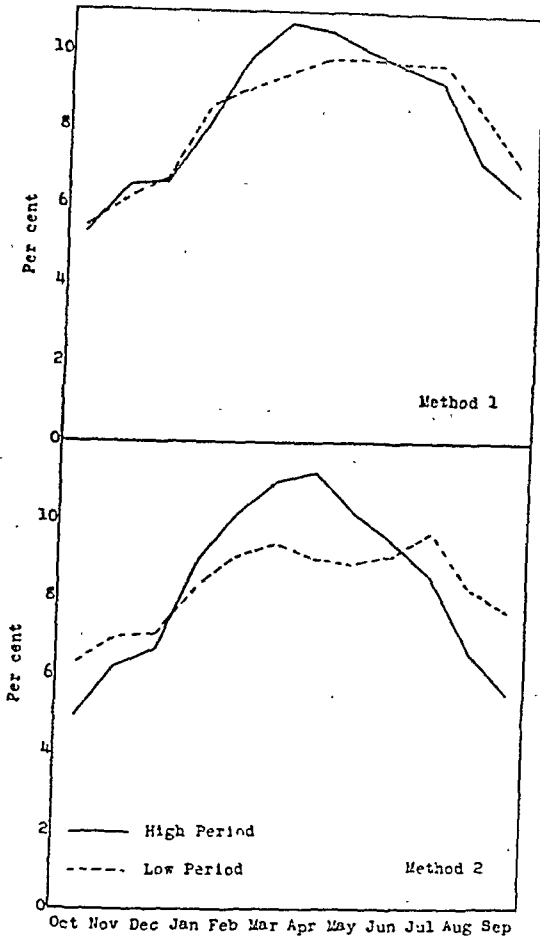
TABLE I  
SEASONAL DISTRIBUTION OF WHOOPING COUGH  
29 STATES COMBINED

Month	High Period				Low Period			
	Method I		Method II		Method I		Method II	
	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases
Oct.	25,906	5.4	29,070	5.0	22,228	5.5	20,240	6.4
Nov.	31,507	6.5	36,371	6.3	25,102	6.2	21,978	7.0
Dec.	31,929	6.6	38,593	6.7	26,972	6.7	22,437	7.1
Jan.	39,282	8.1	52,284	9.0	34,360	8.5	26,246	8.3
Feb.	47,379	9.8	58,890	10.2	36,299	9.0	28,476	9.1
Mar.	51,522	10.7	63,665	11.0	38,210	9.4	29,714	9.4
Apr.	50,761	10.5	65,148	11.2	39,863	9.8	28,182	9.0
May	47,963	10.0	59,278	10.2	39,690	9.8	27,871	8.9
June	46,309	9.6	55,333	9.5	39,466	9.7	28,777	9.1
July	44,312	9.2	50,033	8.6	39,337	9.7	30,576	9.7
Aug.	34,731	7.2	38,869	6.7	34,402	8.5	26,106	8.3
Sept.	30,921	6.4	32,630	5.6	29,117	7.2	24,289	7.7
Total	482,522	100.0	580,164	100.0	405,046	100.0	314,892	100.0



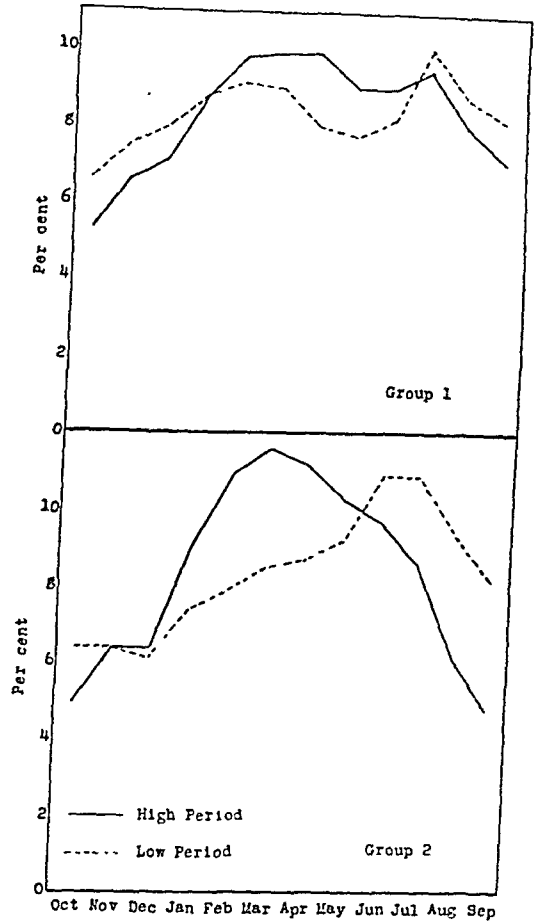
Method II (a and b) to the time series of a state, the combined cases for each month were expressed as a percentage of the grand total for the 3 years. The percentages thus obtained for a high

peak for Illinois, Maine, Michigan, Oregon, New York, and Vermont comes earlier than March; and the peak for Connecticut, Florida, Louisiana, Maryland, Missouri, North Dakota, and Wis-



Graph I. Seasonal Distribution of Whooping Cough. 29 States Combined.

GRAPH I



Graph II. Seasonal Distribution of Whooping Cough. Method 2.

GRAPH II

and for a low period were plotted on a single diagram so that they could be directly compared. Such a diagram was prepared for each of the states.

The peak of the seasonal curve for the high period for Alabama, Arkansas, California, District of Columbia, Kansas, Massachusetts, Minnesota, Mississippi, Nebraska, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Washington, and West Virginia comes in March or April. The

consin comes later than April. The group with an early peak includes northern states in the main, while the group with a late peak includes both northern and southern states. The shape of the seasonal curve for a high year does not seem to be associated with any definite geographical area. In a previous paper on the subject of whooping cough<sup>1</sup> dealing with a year of median incidence, a similar conclusion was reached.

For both high and low periods the minimum month was quite consistently October. In contrast to the relative constancy of the peak month of curves for the high periods and of the low month of curves for both periods, the peak month of curves for the low periods was found to vary a great deal. This was brought out in the following way. The states were classified according to the location of the peak month of the low-period curve relative to the peak of the high-period curve as a standard. On this basis and taking into account the general shape of the low-

period curves, the states fell into one or another of 4 groups.

The combined figures for Pennsylvania, Ohio, New York, and Wisconsin (Group I), are presented in Table II and Graph II. The low-period curve is characterized by a late peak, a low amplitude and is bi-modal.

Table III and Graph II show that for Group II, comprising Kansas, Michigan, Illinois, Maryland, Alabama, North Carolina, and Tennessee, the low-period curve has a late peak but is not bi-modal. Its amplitude is less than that of the high-period curve.

TABLE II  
SEASONAL DISTRIBUTION OF WHOOPING COUGH  
FOUR STATES COMBINED—GROUP I

Month	High Period				Low Period			
	Method I		Method II		Method I		Method II	
	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases
Oct.	9,564	5.3	10,003	5.3	8,960	6.6	8,360	6.6
Nov.	11,939	6.6	12,659	6.6	10,955	8.0	9,473	7.5
Dec.	12,864	7.1	13,447	7.1	11,209	8.2	10,093	8.0
Jan.	14,959	8.2	16,779	8.8	12,553	9.2	11,113	8.8
Feb.	17,542	9.7	18,661	9.8	13,436	9.8	11,519	9.1
Mar.	18,446	10.2	18,939	9.9	12,541	9.2	11,326	9.0
Apr.	18,018	9.9	18,965	9.9	11,162	8.2	10,127	8.0
May	16,437	9.1	17,236	9.0	11,079	8.1	9,850	7.8
June	15,962	8.8	17,165	9.0	10,914	8.0	10,355	8.2
July	17,599	9.7	18,140	9.5	12,198	8.9	12,649	10.0
Aug.	14,263	7.9	15,215	8.0	11,717	8.6	11,087	8.8
Sept.	13,612	7.5	13,569	7.1	9,843	7.2	10,366	8.2
Total	181,205	100.0	190,778	100.0	136,567	100.0	126,318	100.0

Group III (Table IV and Graph III) includes California, Minnesota, Massachusetts, Florida, Missouri, Mississippi, New Jersey, and Oregon. The peak of its low-period curve coincides in time with that of the high-period curve but its amplitude is less.

Group IV (Table V and Graph III) includes Washington, Connecticut, Arkansas, Louisiana, District of Columbia, North Dakota, West Virginia, Nebraska, Maine, and Vermont. The low-period curve is a bit irregular, due perhaps to small numbers, but its peak

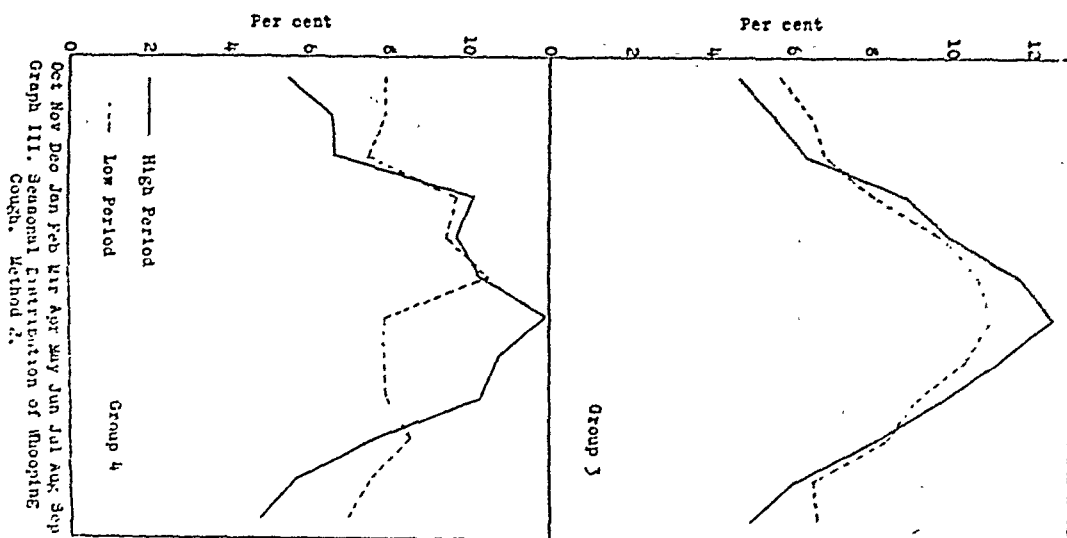
comes earlier than that of the high-period curve. Its amplitude is less.

SUMMARY

During periods of low incidence the seasonal distribution of whooping cough exhibits less amplitude than during periods of high incidence. For 11 states (Groups I and II) the peak of the low-period seasonal curve is later than that for the high-period curve; for 8 states (Group III) the peaks of the 2 curves come at the same time, and for 10 states (Group IV) the peak of the

TABLE III  
SEASONAL DISTRIBUTION OF WHOOPING COUGH  
SEVEN STATES COMBINED—GROUP II

Month	High Period				Low Period			
	Method I		Method II		Method I		Method II	
	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases
Oct.	6,375	4.5	7,924	4.9	5,957	5.8	5,310	6.4
Nov.	8,145	5.7	10,385	6.4	6,326	6.1	5,305	6.4
Dec.	7,904	5.5	10,374	6.4	6,170	6.0	5,049	6.1
Jan.	10,614	7.5	14,588	9.0	8,273	8.0	6,189	7.4
Feb.	13,733	9.7	17,566	10.9	8,714	8.4	6,636	7.9
Mar.	15,780	11.1	18,717	11.6	8,708	8.5	7,106	8.5
Apr.	16,456	11.6	18,052	11.2	9,504	9.2	7,257	8.7
May	15,156	10.7	16,577	10.3	10,117	9.8	7,688	9.2
June	15,446	10.9	15,725	9.7	11,472	11.1	9,138	10.9
July	14,067	9.9	13,820	8.6	11,035	10.7	9,081	10.9
Aug.	10,227	7.2	10,014	6.2	9,501	9.2	7,816	9.4
Sept.	8,131	5.7	7,764	4.8	7,449	7.2	6,836	8.2
Total	142,034	100.0	161,506	100.0	103,226	100.0	83,411	100.0



GRAPH III

TABLE IV  
SEASONAL DISTRIBUTION OF WHOOPING COUGH  
EIGHT STATES COMBINED—GROUP III

Month	High Period				Low Period			
	Method I		Method II		Method I		Method II	
	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases
Oct.	6,995	5.1	7,843	4.7	5,000	4.6	4,617	5.7
Nov.	8,635	6.4	9,382	5.6	5,927	5.5	5,247	6.5
Dec.	8,742	6.4	10,745	6.4	6,763	6.3	5,452	6.8
Jan.	11,680	8.6	14,916	8.9	8,839	8.2	6,535	8.1
Feb.	12,939	9.5	16,856	10.0	9,850	9.1	7,961	9.9
Mar.	14,877	11.0	19,877	11.8	11,766	10.9	8,691	10.8
Apr.	16,072	11.8	21,004	12.5	12,420	11.5	8,848	11.0
May	15,653	11.5	19,097	11.3	11,508	10.7	8,371	10.4
June	13,661	10.1	16,280	9.7	10,492	9.8	7,318	9.1
July	10,819	8.0	13,462	8.0	10,151	9.4	6,720	8.4
Aug.	8,492	6.3	10,229	6.1	8,051	7.5	5,337	6.6
Sept.	7,163	5.3	8,413	5.0	7,040	6.5	5,366	6.7
Total	135,728	100.0	168,104	100.0	107,807	100.0	80,463	100.0

TABLE V  
SEASONAL DISTRIBUTION OF WHOOPING COUGH  
TEN STATES COMBINED—GROUP IV

Month	High Period				Low Period			
	Method I		Method II		Method I		Method II	
	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases	Cases	Per cent of total cases
Oct.	2,319	4.9	3,300	5.5	2,142	5.9	1,953	7.9
Nov.	2,868	6.0	3,945	6.6	2,540	7.0	1,953	7.9
Dec.	3,070	6.4	4,027	6.7	2,766	7.6	1,843	7.5
Jan.	4,642	9.7	6,001	10.1	3,182	8.8	2,409	9.7
Feb.	4,638	9.7	5,807	9.7	3,437	9.5	2,360	9.5
Mar.	5,011	10.5	6,132	10.3	3,979	11.0	2,591	10.5
Apr.	5,349	11.2	7,127	11.9	3,769	10.4	1,950	7.9
May	4,607	9.7	6,368	10.7	3,537	9.8	1,962	7.9
June	4,494	9.4	6,163	10.3	3,421	9.4	1,966	8.0
July	4,282	9.0	4,611	7.7	2,968	8.2	2,126	8.6
Aug.	3,336	7.0	3,411	5.7	2,494	6.9	1,866	7.6
Sept.	3,095	6.5	2,884	4.8	2,007	5.5	1,721	7.0
Total	47,711	100.0	59,776	100.0	36,242	100.0	24,700	100.0

low-period curve comes earlier than that of the high-period curve. When the high-period and the low-period curves of the various states are classified according to the time at which their peaks occur, they do not fall into consistent geographical groups based upon climatic conditions.

*Note:* The author wishes to acknowledge his indebtedness to Huldah Bancroft for assistance in making arithmetical calculations and in drawing up the tables and graphs.

#### REFERENCE

1. Harmon, G. E. Seasonal Incidence of Whooping Cough in the United States. *A.J.P.H.*, 22:831 (Aug.), 1932.

# The Fence or the Ambulance

JOHN N. HURTY, M.D.

'Twas a dangerous cliff, as they freely confessed,  
Though to walk near its crest was so pleasant.  
But over its terrible edge there had slipped  
A duke and full many a peasant.  
So the people said something would have to be done,  
But their projects did not at all tally,  
Some said, 'Put a fence 'round the edge of the cliff';  
Some, 'An ambulance down in the valley.'

But the cry for the ambulance carried the day,  
For it spread through the neighboring city;  
A fence may be useful or not, it is true,  
But each heart was brim full of pity  
For those who slipped over that dangerous cliff;  
And the dwellers in highway and valley  
Gave pound or gave pence, not to put up a fence,  
But an ambulance down in the valley.

'For the cliff is all right if you're careful,' they said,  
'And if folks even slip or are dropping,  
It isn't the slipping that hurts them so much  
As the shock down below when they're stopping.'  
Then an old sage remarked, 'It's a marvel to me  
That people give far more attention  
To repairing results than to stopping the cause,  
When they'd much better aim at prevention.

'Let us stop at its source all this mischief,' cried he,  
'Come, neighbors and friends, let us rally,  
If the cliff we will fence we might almost dispense  
With the ambulance down in the valley.'

'Oh, he's a fanatic,' the others rejoined.  
'Dispense with the ambulance? Never!  
He'd dispense with all charities, too, if he could;  
But no! We'll protect them forever;  
Aren't we picking folks up just as fast as they fall?  
And shall this man dictate to us? Shall he?  
Why should people of sense stop to put up a fence  
While their ambulance works in the valley?'

But a sensible few who were practical, too,  
Will not bear with such nonsense much longer,  
They believe that prevention is better than cure  
And their party will soon be the stronger.  
Encourage them, then, with your purse, voice and pen,  
And (while other philanthropists dally)  
They will scorn all pretense and put up a stout fence  
On the cliff that hangs over the valley.

# Epidemiology of Syphilis and Gonorrhea\*

WILLIAM L. MUNSON, M.D., F.A.P.H.A.

*State Department of Health, Albany, N. Y.*

ONE year ago I had the privilege of presenting to you a record of some outbreaks of syphilis and gonorrhea which had come under my observation over a period of years. I wish now to present more recent investigations.

There is not too much education but too little actual epidemiology; not too much attention to treatment of cases known but too little prevention. There should be a real constructive program rather than just palliation. Just as with other communicable diseases we must have a case finding machinery—and when cases are found something must be done about them. The reason progress is so slow is because of our prudery and our false sense of modesty.

You know as well as I, that when we talk smallpox, typhoid or undulant fever, we talk it right out. We get the information. We collect the data, and we never ask ourselves questions about the propriety of our actions. When it comes to syphilis or gonorrhea we hush it and pass it by. We begin to qualify with ifs and ands and buts—we wonder if it is not too delicate a thing really and purposefully to investigate. Silly shame takes hold of us and we think silence is the best way out.

Dr. Ruedemann of our staff in New York State pointed out this salient difficulty in a talk on syphilis and

gonorrhea when he quoted Bernard Shaw: "We live in an atmosphere of shame. We are ashamed of everything that is real about us, ashamed of ourselves, of our relatives, of our incomes, of our opinions, of our accents, of our experience, just as we are ashamed of our naked skins."

Another reason for failure in this field of public health endeavor is that we just do not do it, assuming that we cannot get the facts—so why bother very much?

May I present an actual experience to show precisely what I mean?

Questioning of a patient in a V. D. clinic:

State Nurse: "Where did you get your infection?"

Patient: "I won't tell you."

State Nurse: "But you have got to tell me."

Patient: "Well, if you must know, I got it from George —."

Local Nurse: "You never told me that."

Patient: "You never asked me."

What public health official would have the supervision of a typhoid outbreak and content himself with lectures on the disease? He would investigate every case minutely; every contact would be subjected to careful scrutiny. The source of infection would be diligently sought and controlled. Why not the same procedure with syphilis and gonorrhea? Is it not now considered good public health and preventive medicine to investigate the single case

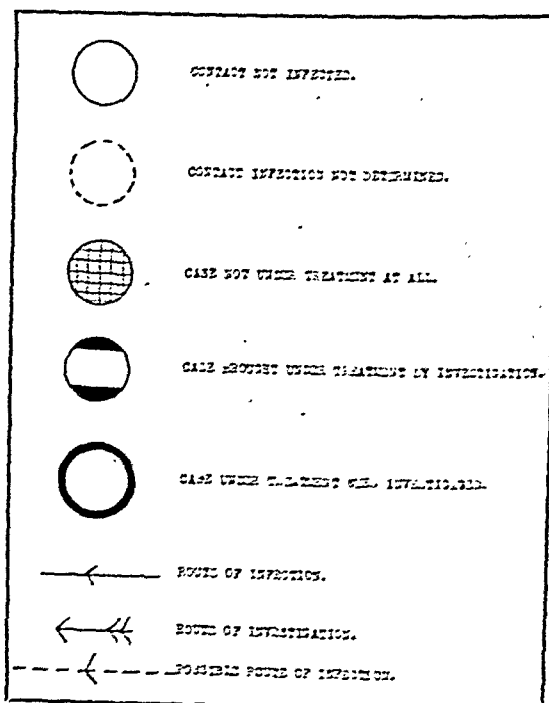
\* Read before the Epidemiology Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

of smallpox or typhoid? Do we wait for an epidemic? Don't we make quite a fuss about these single cases? Don't we look up contacts and keep them under observation, knowing full well that big epidemics from single cases grow? Is syphilis any different in any of its epidemiological implications, manifestations or behavior?

Any communicable disease is entitled to the amount of attention that its prevalence and harmfulness to the human race demands. I need not tell you what the magnitude of the problem is which syphilis and gonorrhea present. Estimates and figures vary, but these diseases are well up in the list of morbidity and mortality. We all know that they rank high as destroyers of human happiness. I wonder if they have not frustrated as many careers as some of the other diseases to which we give much more attention. Surely the misery and anxiety which they cause, taken with the financial cost for both early and late treatment and institutional care, make the problem of their abatement one of paramount importance to the tax payer.

Last spring I started out to see if as a routine measure I could pick up the trail and dig out of communities their problem so far as these diseases were concerned. I do not believe that the data and tracings submitted are anything unusual or peculiar. If these investigations had not been made probably no one would have known that the diseases existed in these communities; that is, not until some very serious happening occurred. I feel quite sure that the experience in my district is nothing unusual but can be duplicated in any given community from time to time. Of course, one can gloss over the situation by ignoring it, but it cannot be done forever. The bill has to be paid in the end and the longer payment is postponed the more difficult is the final and inevitable settlement.

The real investigator and epidemiologist finds his leads in many ways. Every human activity is of interest to him when he is on the hunt. When science is on the track of truth it scorns nothing, no matter how remote, that may have a bearing. The thing most desired in the investigator is the ability to know what is spurious and what is real information. Just a casual remark was the reason for the start of one of the investigations I am reporting in this paper.



KEY TO READING OF TRACINGS

The greatest source of information in getting leads to investigate, in my experience, is the public health nurse. She knows the community in which she works, and its people. She is one person who knows most of the troubles and difficulties of the families under her care, and she is the one who does most toward the solution of these problems. Physicians, if you are on friendly terms with them, will give leads that are of the greatest value. Looking up the card reports of clinics is profitable; they are worth careful scrutiny. Not



every one, of course, will give a lead that is worth further labor. Laboratory reports, too, should always be consulted—frequently they are the source of real clues and useful information.

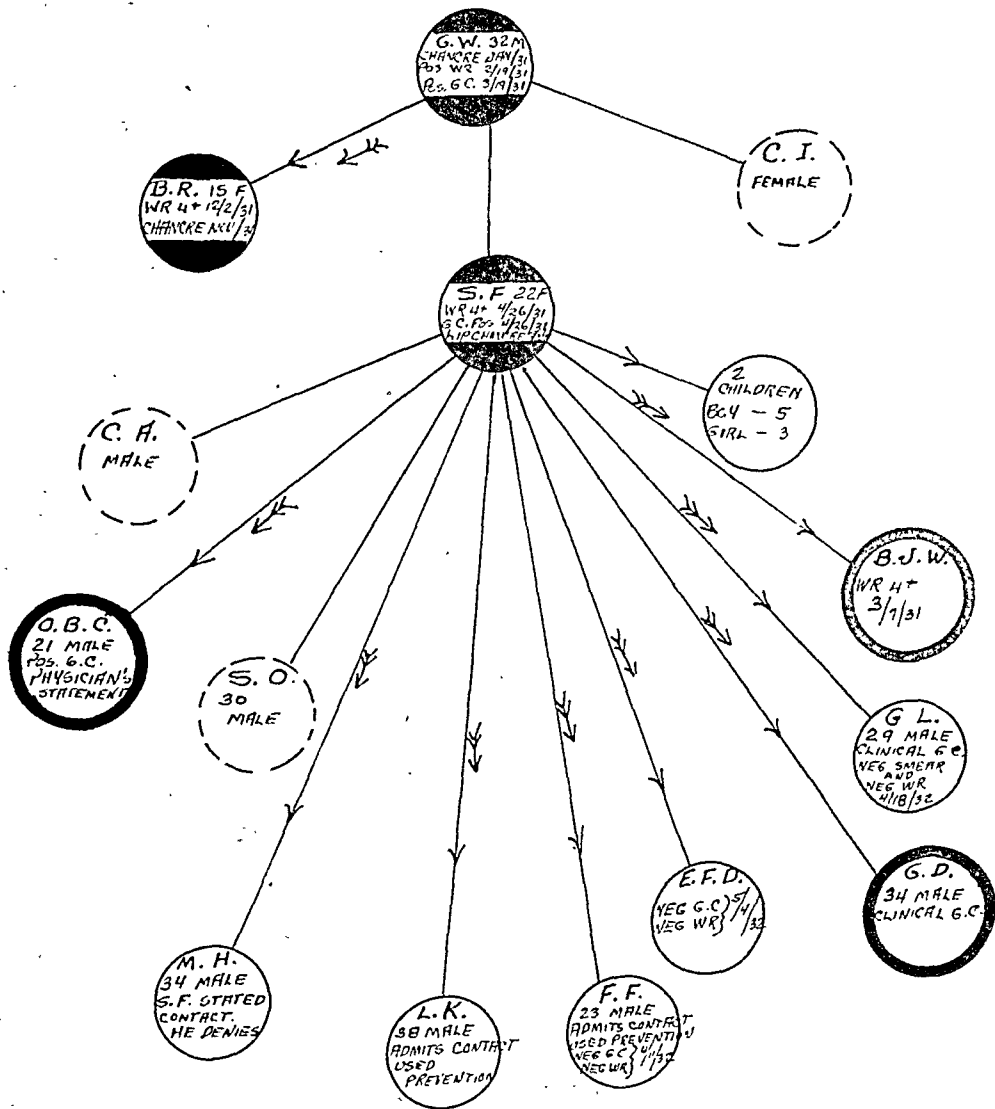
The tracings herewith submitted are selected from 19 investigations recently made and chosen because it is thought that they point out some particular phase or type of investigation either from approach or methods. In 15 of

these 19 investigations the source of infection was discovered.

TRACING I

This outbreak occurred in a village, population about 6,000, and a city of 20,000 population.

The investigation of these cases resulted from a discussion with the local nurse concerning the prevalence of syphilis in her community. She stated that she knew S. F. as a person who might be a source of infection.



TRACING I

EPIDEMIOLOGY OF SYPHILIS AND GONORRHEA—VILLAGE, 6,000, AND CITY, 20,000

She made the initial investigation which I followed up by further investigation and interviews with this person. The data acquired were turned over to a nurse and trained worker who continued the investigation.

Information indicated that G. W., a male in a nearby city, was the first case in this series. His chancre occurred sometime in January, 1931. The infection was transmitted to S. F., a female, and she had a lip chancre in the early part of February, 1931. She was given some treatment at that time but it was not continued. The investigation brought her under treatment again and she has adhered to it since.

The tracing indicates the contacts of S. F., some of whom developed gonorrhea. These cases were taken care of by a physician who admitted the diagnosis but would give no further data. This woman had a positive gonococcus smear April 26, 1931.

Of particular interest is the fact that E. F. D., a contact, was found to have moved to Newark, N. J. This was taken up with the health commissioner, Dr. Craster, of that city and he reported that the man had "been located, examined and found negative. This was fortunate for him for he admitted having been exposed to the disease. Thank you for advising us of this possible menace."

G. W. was also the source of infection for B. R., 15 years of age, female, residing in the city, who had a chancre November, 1931, and positive Wassermann December 2, 1931. When the nurse discovered this girl she had a temperature of 103° F., which followed the birth of a live child which her mother had burned up in the furnace. No physician had been in attendance and apparently a premature birth had been produced. The nurse felt it her duty to obtain a physician to care for this unfortunate girl.

In attempting to do this a very interesting sidelight on syphilis was obtained. The nurse called upon a doctor and asked him to take the case. He refused, saying that he did not care for that kind of case. He, however, plied the nurse with questions and continued the conversation with her saying, "You are going at this syphilis business in the wrong way—you should try to prevent it." Not long before, he had had a letter from the dean of the college attended by his son stating that the boy had syphilis and was under treatment. The girl with whom the boy kept company had been sick for 2 months, but syphilis in this family was a thing not to be thought of—no Wassermann had been taken. The doctor told the nurse that he did not know what to do, but finally he went to the girl's physician and stated the facts. A

Wassermann was then taken which was 4-plus. Treatment was started and the girl promptly began to get well. Syphilis is no respecter of persons. Every once in a while, every doctor should read Osler's dictum, "Know syphilis in all its manifestations and all things else clinical will be added unto you."

This was the only instance in this series in which the police power was used. G. W. was taken in by the police, told that unless he continued his treatment he would be put under arrest, and the facts of his relations with B. R. were given to the district attorney of the county.

While the most of these contacts occurred in the village of 6,000 population, the first 3 cases, B. R., G. W., and C. I., were in an adjoining community of about 20,000 population.

## TRACING II

This is a gonorrheal outbreak in a rural population of about 100.

The situation in this community was brought to light when I was discussing with persons in another county the situation as regards the control of syphilis and gonorrhea. We were then investigating an outbreak of syphilis in that community. The remark which caused this investigation was: "We are no worse in this county than they are in ——— county. There is one community there where everyone has it." Inquiry determined the location of this community and investigation with the health officer brought to our knowledge the situation here detailed. Later a trained worker from the department, Julia MacPhillips, completed the investigation. She is the worker employed on most of these investigations. It is upon her data that the tracing is based.

L. M. came to the home of P. H., a well-to-do farmer, as his housekeeper. Within a short time this man was required to go to the hospital due to a severe urethritis which was found to be gonorrheal. Interviews with the 18-year old housekeeper brought out the story that she had received her infection from C. M. before she had come to her present location, while living in another community some 22 miles distant. She gave the names of the contacts to the nurse, who was able to see that she got to her physician who continued treatment.

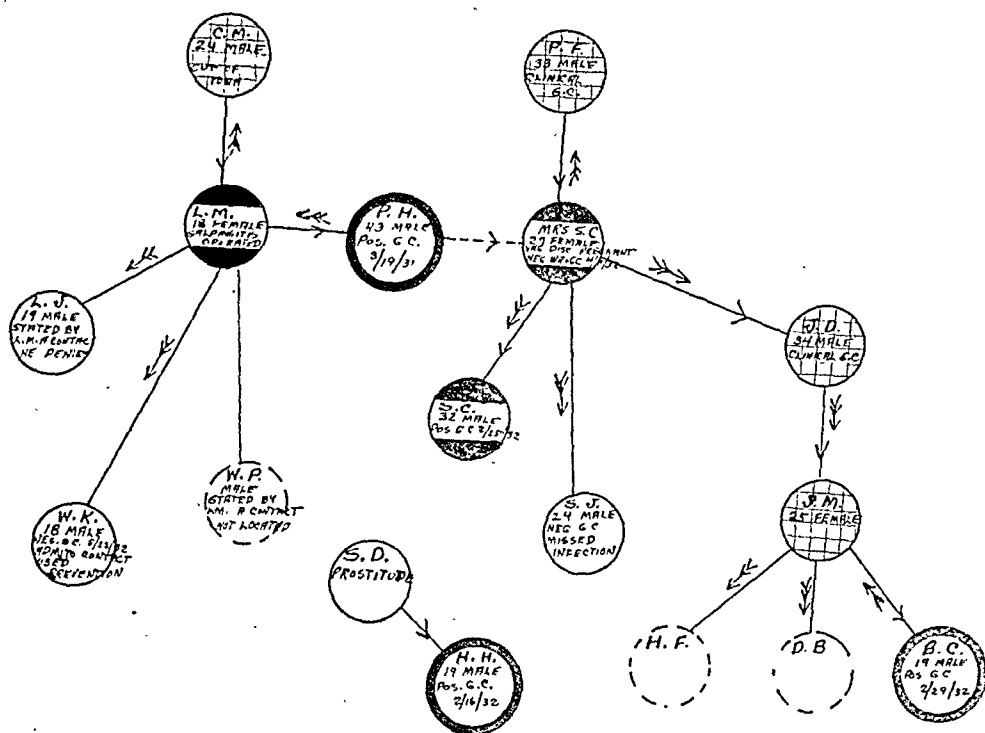
Mrs. S. C., whose husband S. C. developed gonorrhea with a positive smear, was thought by the investigator to have received her infection from P. F., an old gonorrheic. The infection may have come from P. H., because of a happening which occurred in the fall of

1931. It appears that Mrs. S. C. had carried on some negotiations with P. H. which had been discovered by her husband. He became very much incensed but later when the depression became more acute, suggested to his wife that she reestablish relations with P. H. and "shake him down for some coin." I am inclined to think this was the cause of the infection.

J. D. received his infection from Mrs. S. C.

trolling gonorrhea. Apparently she thought that there was an attempt being made to get her brother into trouble because of the hired girl being a minor. At any rate, P. H. was married to L. M., apparently at the insistence of his sister.

In this tracing there is evidence that gonorrhea was introduced into this community on two occasions—by L. M., which spread to others, and by H. H., in which there



## TRACING II

### EPIDEMIOLOGY OF RURAL GONORRHEA

and apparently transmitted it to his wife, J. M. Neither of these persons was under treatment except what they gave themselves. Mrs. J. M., in turn, transmitted the infection to B. C., who had a positive smear.

At the same time, another case, H. H., age 19, appeared, which to all indications had nothing to do with the epidemic. His story shows that he had gone to a nearby city and 3 days after his visit had gonorrhea with a positive smear. From the evidence there can be no question that this case was an infection got in the city from a prostitute.

In the case of the housekeeper for P. H. there seemed to be some difficulty on the part of his sister to understand that the investigation was solely for the purpose of con-

trolling gonorrhea. Apparently she thought that there was an attempt being made to get her brother into trouble because of the hired girl being a minor. At any rate, P. H. was married to L. M., apparently at the insistence of his sister.

## TRACING III

This series of cases was found by the nurse, a trained worker, after Dr. B. had told her that one of his patients had acquired disease out of town. The doctor did not want to give the name of the patient. The only information was that the girl who was the source of the infection worked in a restaurant in a nearby city; that the girl's nickname was "Peggy," and that she had a sister who

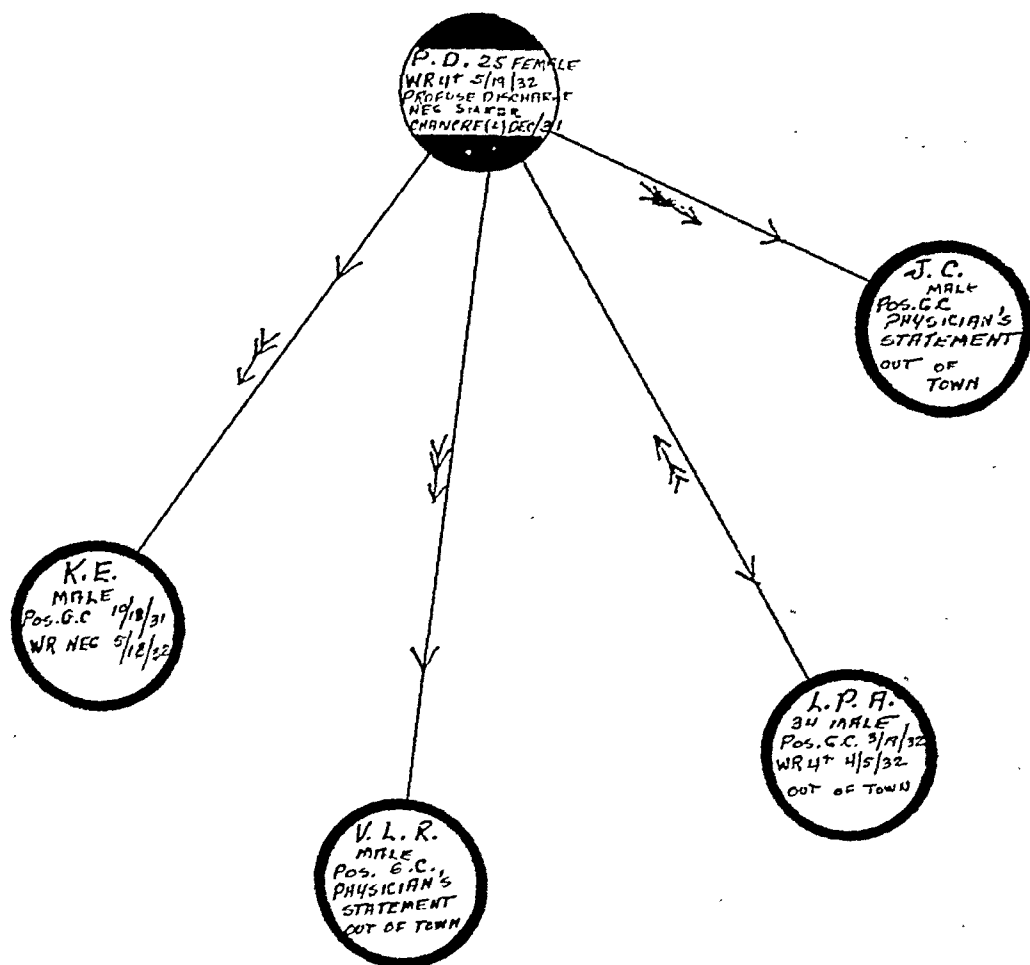
probably worked in a factory in the same city.

With this information the nurse located P. D., age 25, and found out that she had gone to a clinic in the city in September, 1931, had requested a Wassermann, and had returned several times to get a copy of the report, which was negative. Her desire to have this report was stated to be that some man had accused her of giving him a disease and she wanted to prove that she was all right. The nurse then called at the girl's home and on the family, which is considered a very respectable one. Arrangements were made by the nurse to have a personal interview with this girl. She gave the names of 3 other persons, all of whom were checked up and found to be under the care of the clinic or a private physician.

While this girl was never found to have

a positive smear, she had infected L. P. A. with both gonorrhea and syphilis. This was the only possible source of infection he had had. When he presented himself first the doctor considered that he had just a gonorrheal infection which seemed to persist, and at a later date the patient showed a secondary syphilitic rash and it was not until this time that a Wassermann was taken. This points out the necessity of taking a Wassermann on all patients with a venereal history. The doctor thinks that probably his patient had an intra-urethral chancre which he missed at the time of his first examination.

There is a history that the girl, P. D., at Christmas, 1931, had a sore in the vagina which lasted some time and which was probably a primary chancre, although at that time she attributed it to the use of a douche



TRACING III

which was too hot. She has been put under treatment which she is faithfully following in the clinic in the city.

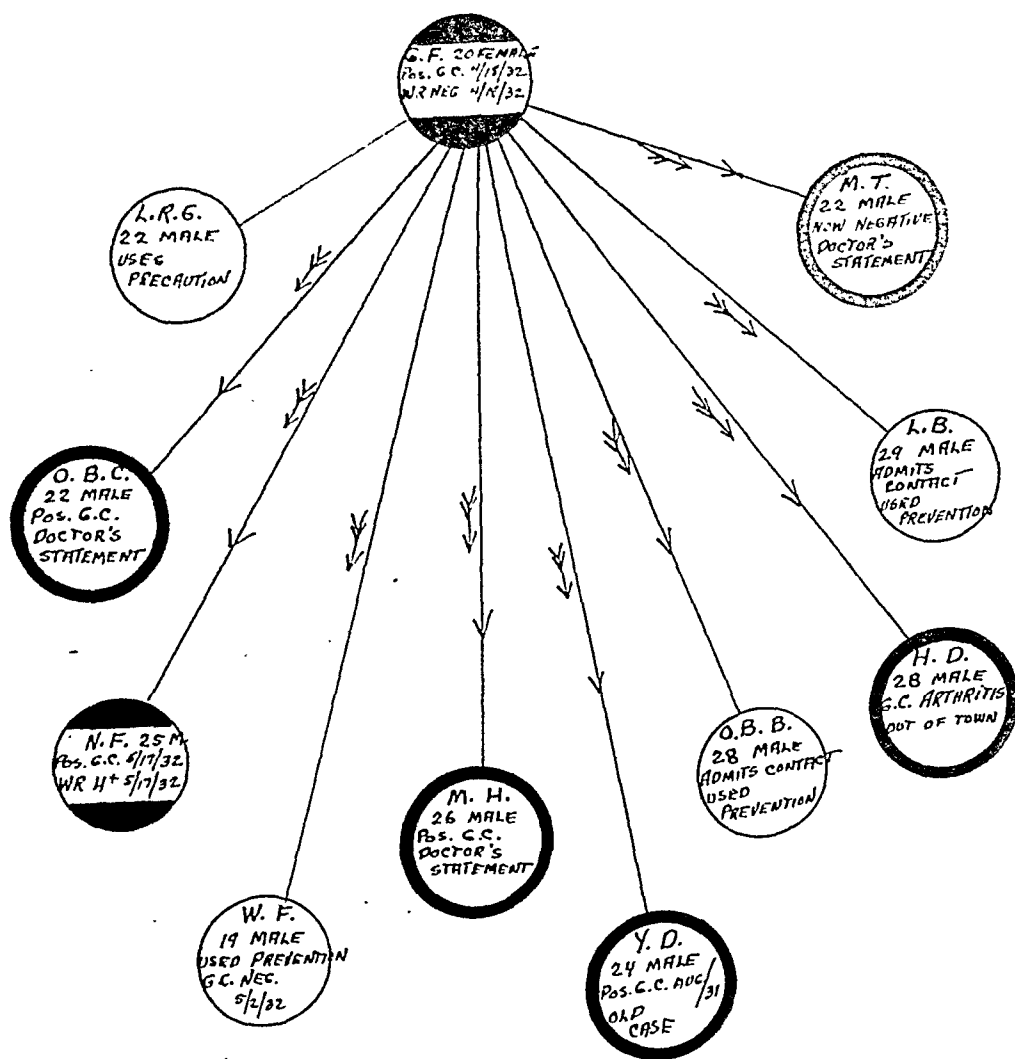
The important lessons of this investigation are: (1) Always take a Wassermann. (2) That physicians will refer their private cases for investigation if they have confidence in the worker.

#### TRACING IV

This series of cases occurred in a village of approximately 6,000 population. The girl who was the source of infection was discovered because in making another investigation the nurse heard her name mentioned several

times, and local inquiry brought out the fact that she was promiscuous. She had come in June, 1931, from a village some 30 miles distant from her present abode. She stated that she has been infected for 2 years.

The nurse pointed out to her the danger she was in the community, and stated that her only object in coming to see her was to be of service and to get her under treatment. She gave complete confidence to the nurse and informed her of the contacts which are noted. Arrangements were made by the nurse to have her treated by the private physician of her choice and at her own expense since she was earning a good salary. She has conscientiously followed her treatment and so



#### TRACING IV

EPIDEMIOLOGY OF GONORRHEA—VILLAGE, 6,000

far as we have been able to ascertain has infected no one since.

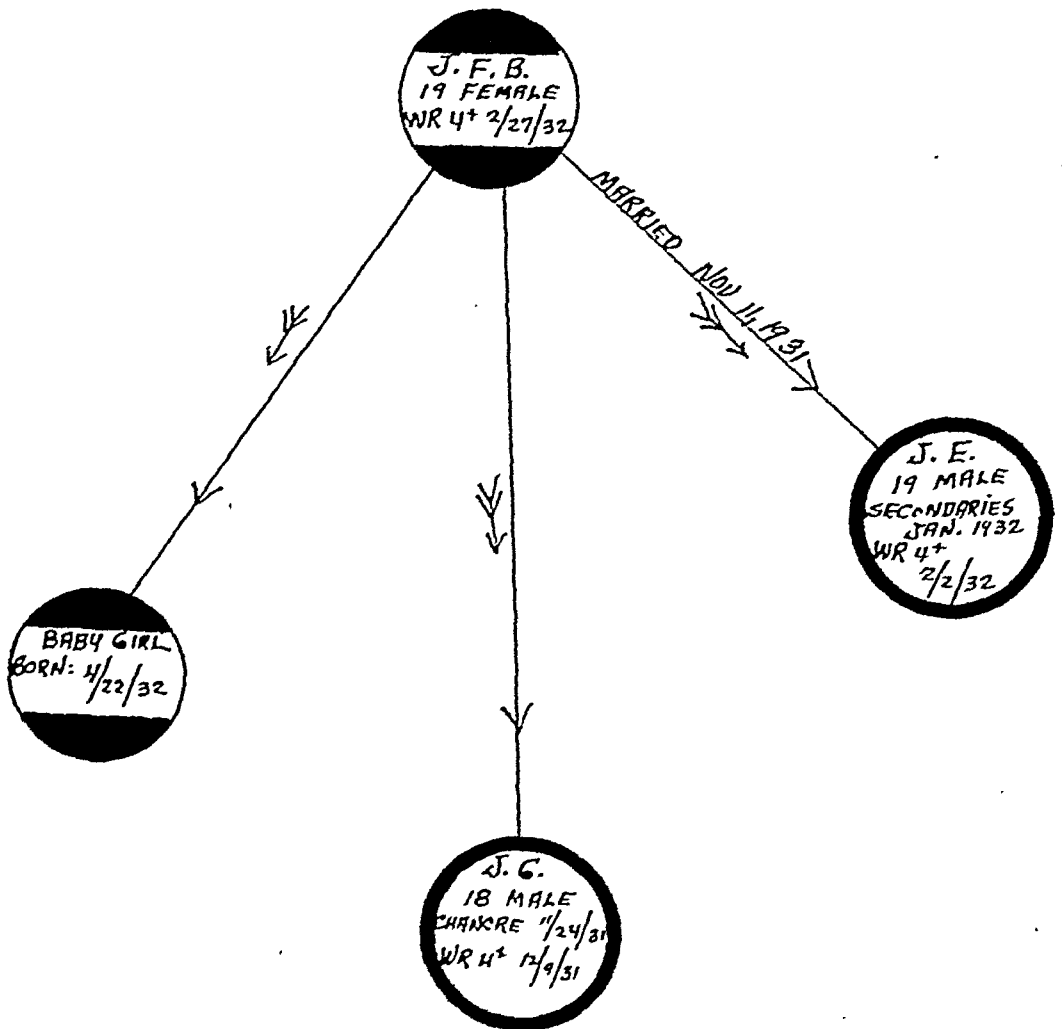
#### TRACING V

This tracing represents family syphilis in a group of people living 3 miles off the State Road in a rural section. The source of infection of these cases came from out of the state in March, 1931, to live with her mother who was the housekeeper in the family.

This girl had contact with J. G., who developed a chancre November 24, 1931, and a Wassermann taken December 9, 1931, was positive. On November 11, 1931, she married a cousin of J. G., who developed secondaries in January, 1932, and had a positive Wassermann February 2, 1932. Primary chancre was

not noted in this case. The girl is full-blooded white while the two men are each quarter-colored.

These men both reported to a doctor in a nearby village when their trouble began and have been under treatment by him. This doctor worked out the epidemiology involved and suggested that the girl come in for treatment, but this she failed to do. The next known of the situation was when the county nurse obtained information which led her to make a prenatal visit on this girl. She made inquiries which aroused her suspicions and consulted with me; I then checked up with the doctor and found out the story detailed here. The prospective mother was promptly put under treatment but not sufficiently early to prevent syphilis in her baby,



TRACING V

born April 2, 1932. This baby had snuffles, was puny, marasmic, had cranio-tabes and also a peculiar rash which looked like sudamina. It was promptly put under treatment. The skin cleared up, the snuffles ceased, and the marasmic condition improved until the child became the picture of health.

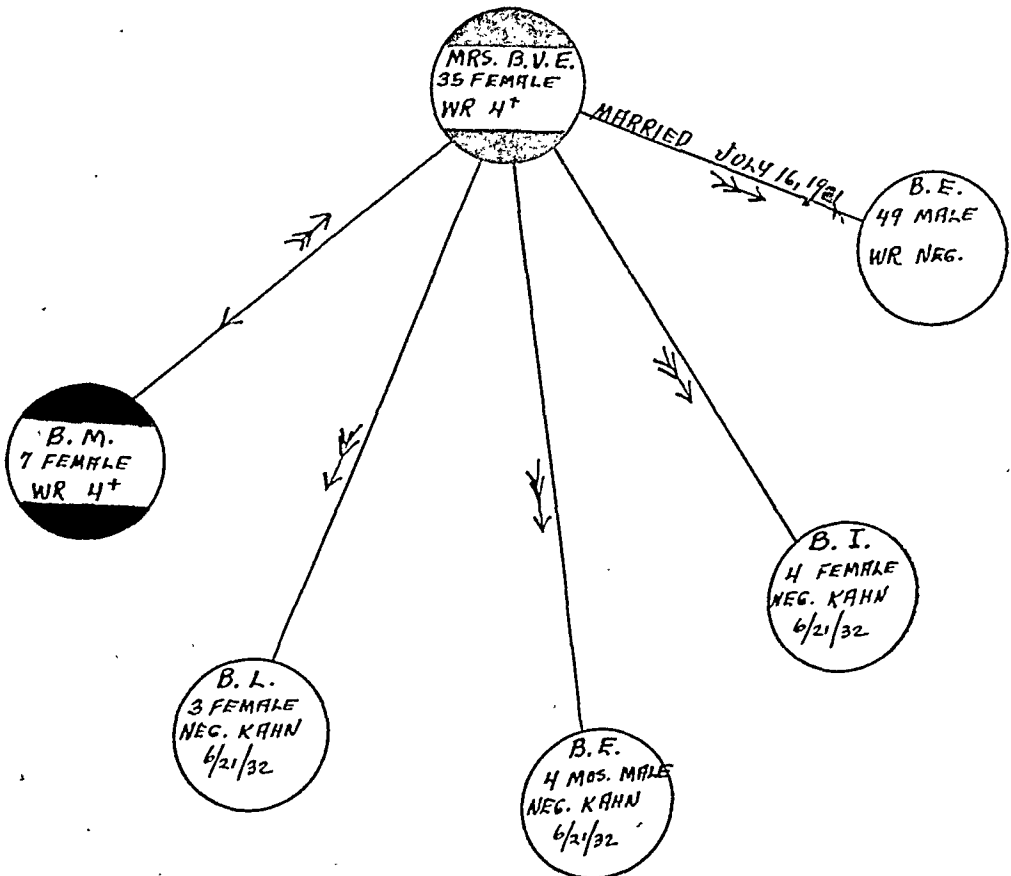
This series of cases points out one of the difficulties which private physicians feel—that they do not think they can go ahead and make investigations looking to get contacts under treatment lest they be accused of having a commercial interest. It seems to me also to prove the necessity for the investigation of cases of syphilis. The probabilities are that if this nurse had not found the girl as a prenatal case she would have continued without treatment; the baby would have had no treatment, and would have died. Further, it shows again that syphilis is carried from one community to another; in this instance from one state to another.

TRACING VI

The history of this family is reported because it shows another method in which one can come upon the trail of syphilis.

B. M., age 7, was reported from a village school as suffering with alleged pink eye. The nurse became suspicious and reported the matter to the county nurse, who with the school nurse took the case to the local family physician who referred it to an eye man in a distant city. This specialist made the diagnosis of interstitial keratitis, had a Wassermann taken, which was 4-plus, and then an investigation was begun of the family. Mrs. B. V. E., mother of the child, was found to have a 4-plus Wassermann. Her husband, 49, was negative, as were her 3 children, ages 3 and 4 years, and 4 months, respectively.

There is a history that Mrs. B. V. E.'s mother was syphilitic, and the contention of the attending physician was that the syphilis



TRACING VI

EPIDEMIOLOGY OF FAMILY SYPHILIS—VILLAGE, 5,000

was congenital in Mrs. B. V. E.; also in B. M. Investigation was made of the grandparents on the mother's side. The grandmother, age 81, showed a negative Wassermann on two tests. There had been 12 children in her family. All were alive and well except 3 who died in adult life, the cause of death being not definitely known in any. The grandfather, age 84, 3 years before, had a fractured hip, at which time he went to a hospital, but no Wassermann was taken. A year later he went to another hospital in the same city for a prostatectomy. There is no record that a Wassermann was done at this time.

Mrs. B. V. E. had no previous knowledge of her syphilitic infection. She denied any extra-marital or pre-marital intercourse that might account for her disease. She was married at 25, and it was 6 years before her first child was born. She had wanted a large family and was disturbed because she did not become pregnant. This sent her to numbers of physicians to see what the trouble was, none of whom took blood for a Wassermann test. She had no miscarriages, no sores on her body, or rash of any kind.

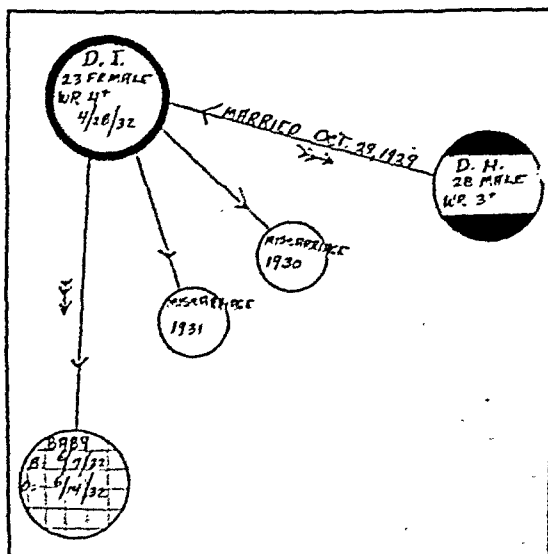
Here are 3 persons in this family who came under medical treatment and a Wassermann was never done on any until we began our investigation. If, in the case of the mother, a Wassermann had been done by one of the physicians whom she had consulted because she was not having babies, she could have been treated and the necessity of treating her present 7 year old daughter averted. If we could get physicians into the habit of taking Wassermans we would unquestionably discover a lot of syphilis and save a lot of money which has to be expended on treatment for syphilis that could be easily prevented.

#### TRACING VII

This tracing is submitted because the original case was found in a routine prenatal clinic, due to the fact that a Wassermann was taken on the mother who had had two miscarriages. D. I. was 4-plus on April 28, 1932. She was given 3 anti-syphilitic treatments before her baby was born, June 7, 1932, but the child died a week later, apparently of syphilis. Because of the Wassermann taken in the prenatal clinic, there was no investigation of the husband until I had stumbled upon the report seeking to work out some studies in the epidemiology of syphilis, and it was only then that he, B. H., was found to have a 3-plus Wassermann. Both are now under treatment.

It is apparent that where positive Wasser-

manns are found the contacts should be checked up. No public health worker could think of seeing a case of smallpox or typhoid and neglect to search out those who might be infected among the contacts. It seems that this is almost axiomatic. It is difficult to see how failure to do this could be construed as anything but disregard of a plain duty.



#### TRACING VII

EPIDEMIOLOGY OF FAMILY SYPHILIS—  
VILLAGE, 800

It would be interesting to tell you of the cases of syphilis which we have found in some outbreaks of smallpox. I saw one where a school bus driver had pustular smallpox and, in between his smallpox lesions, the papular lesions of syphilis. This man was traced by his smallpox and the children under his care had all been vaccinated in time to prevent infection. Back-tracking this man to the nearest genitourinary specialist showed that he also had a positive Wassermann.

There were 3 other cases of syphilis in smallpox patients, one of which was a mistaken diagnosis and is a most intriguing story. My Montreal paper was sent to our clinic directors. One replied that he thought the epidemiology of syphilis a very questionable thing. It seems that a patient was sent



to this doubting Thomas, who was also health officer, by another physician, with a diagnosis of smallpox. He noted the lesions and found a sore throat. He became suspicious of syphilis, took a Wassermann which was 4-plus, and then this health officer investigated the family and found that the husband and children were free from syphilis, but that about 8 weeks before a boarder had come to the house. This boarder had been to a physician and been treated for a venereal disease. He then escaped to parts unknown and has just been located, but no Wassermann has been taken. This health officer is now conducting investigations into the source and interviewing contacts of both syphilis and gonorrhea.

The question of who is to do the field work in the epidemiology of syphilis and gonorrhea brings up the discussion of the qualifications required in such a person. There are certain people who are just not fitted to make any sort of epidemiological investigation. They work hard but they do not get anywhere. They have not the knack of getting to the thing that is pertinent and do not know what the really pertinent thing is—always finding the irrelevant and immaterial. What we need is a trained worker in epidemiological methods in syphilis and gonorrhea. This particularly trained worker should be the teacher of the general all-purpose public health nurse. The place to learn and teach this is in the field. At present in New York State all of our group instruction to the local nurses for this year is on gonorrhea

and syphilis, and due attention will be paid to the epidemiology of these diseases.

My own idea is that the will-to-do, plus a certain amount of self-confidence in the investigator that he can do it, is most necessary. I have had one experience with a nurse who did not see how she could possibly ask these questions and do this work. She was told that she would not get anywhere with a negative approach and afterward became convinced that she could do it, and then went out and did one of the best pieces of work I have seen.

The best "thrillers" have by no means been selected from the number of investigations made. There is one investigation in which a divorce occurred and in which the infected woman gave the testimony on which it was granted. The husband in the case refused to give blood for a Wassermann. I reviewed the testimony and then saw the Supreme Court Justice who conducted the suit. I showed him my data which involved the infection of some 10 persons. I told him the husband had refused a specimen to which the judge replied: "Doctor, you are entitled to take blood from ————. If he refuses tell him that I shall cite him for contempt of court."

No definite attempt is made here to arrive at any conclusions. The items which might be stated as conclusions are so apparent that to recite them seems unnecessary. The attempt made in this paper is to point out that the epidemiology of syphilis and gonorrhea is possible and can be done.

---

NOTE: See *Discussion* of this article on page 808.

## DISCUSSION

EDWARD S. GODFREY, JR., M.D., F.A.P.H.A.

*Director, Local Health Administration, State Department of Health,  
Albany, N. Y.*

THE paper which Dr. Munson read at Montreal last year, besides creating something of a sensation drew a challenge from some of the group of specialists in the field of venereal diseases and social hygiene. Among other things they pointed out that most or all of the epidemics Dr. Munson cited had occurred several years before.

The claim was made that conditions are different now and that as much follow-up is being done as is consistent with the social factors peculiar to the venereal diseases.

Dr. Munson has answered these criticisms by investigating recent cases and in doing so has demonstrated how inadequate the usual follow-up is. That every one of his investigations has proved fruitful or worth the time spent upon it cannot be claimed—certainly not in terms of immediate results. But the pioneer often fails to pick the shortest and easiest road to his objective. It is to be expected that those who follow will make improvements or find a better way. And so in the epidemiological method. The unproductive lines can be discarded. It seems to me inadvisable, for example, to pursue very far the illicit sex rela-

tions of persons of the underworld.

On the other hand, merely to examine the family contacts of venereal cases is to fall far short of what is not only feasible but a necessity, if the ill effects of these diseases are to be materially reduced. A dictum which I think should be burned into the mind of every health officer is that investigation is a necessity in the control of communicable diseases; that there is no control without investigation.

The investigation necessarily must be adapted to the particular diseases. The investigation of typhoid follows a different line from that of smallpox. It must also be adapted to the purpose we have in view. In smallpox the emphasis is on prevention, in measles on amelioration of the effects.

One of the functions of epidemiology as I conceive it, is not merely to find out things about the disease, but to devise methods of investigation and means of applying the knowledge.

The great value of Dr. Munson's paper is in its putting the venereal diseases before us as *communicable diseases* and its straightforward attempt to hew a path which others may follow and probably improve as we gain experience and wisdom.

# Practical Uses of Diphtheria Immunization Records\*

EDWARD S. GODFREY, JR., M.D., F.A.P.H.A.

*Director, Local Health Administration, State Department of Health,  
Albany, N. Y.*

RECORD keeping is probably the pet aversion of the physician. Some at least, carry it with them to the health department when they become health officers. Other so-called "practical" people object to making, collecting, and tabulating records on the theory that it wastes their resources.

Referring to records of immunization one finds these "practical" people saying that "records do not get children immunized"; that "I can use the people needed to keep records to get more children immunized." Both are mistaken. Records do help to get children immunized and they can do more effective work than could be purchased for the same cost in direct action.

In the first place it is needful to know who among a group of children have been immunized in order to save the efforts of canvassers. Canvassing has proved the most effective method in securing immunizations, but it is expensive. The possession and use of properly kept records will save their cost of this item alone. Even if unpaid volunteers are used, as sometimes in a "drive," the cost may be saved. Neither volunteer nor professional relishes visiting households that have already been immunized and

serious damage to morale may result from failure to sort out the immunes.

The record of the individual is also useful in determining whether a reported case of diphtheria received his full course of injections at the time and place stated. In a number of instances when this claim has been made it has been possible to show that the time was much less remote than stated; that they had less than the full course of injections; or that they were not there at all. The record is also of use as proof of the individual's having received the required series of injections. These are demanded by not a few summer camps and playgrounds.

Records help to get children immunized in another way. The tabulation of the records tells the health officer, and enables him to tell the community authoritatively, where it stands—how much has been accomplished and how much remains to be done. It substitutes a definite figure for a wishful guess.

Some years ago, following an "intensive drive" along the lines then necessary, the leader of this drive announced that 90 per cent of the children of the city had been immunized. Although there had been enough noise and confusion seemingly to immunize the entire county, a skeptical state health department questioned the figures and asked for the records. After eliminating duplicates and correcting

\* Read before the Epidemiological Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

errors it was found they had achieved the very creditable figures of 35 per cent of the under-5 age group, 65 per cent of those 5-9 years, and a little over 30 per cent of the 10-14 group. It was a very successful "campaign" and seemingly it stopped diphtheria, but a hard boiled tabulation of their records showed there was still work to be done.

The officials of another city making large claims for immunization work were becoming skeptical of its value. According to them they had immunized some 30 to 40 per cent of the younger children and nearly 100 per cent of the older ones. Had they kept up their pace and their method of calculation it would have been a matter of only a few years until they could have shown over 100 per cent in the first group and 200-300 per cent in the second. They overlooked the fact that children *do* get older.

I am aware of the claim made by some that they can "make a pretty close estimate" from the amount of T-A they give out. Toxin-antitoxin and toxoid are furnished to physicians free of charge in New York State, the result being that unquestionably some of it is wasted. While there are probably few who inject the entire contents of a 5 c.c. bottle for each shot as one elderly gentleman was found to be doing, yet there are not a few who use but 1 dose out of a bottle in their private practice. Not having many to inject at the same time they prefer to get a new bottle for each injection rather than risk contamination. At clinics nobody ever keeps count of the bottles that are tipped over, those that break, the needles that clog and suddenly let go with an attendant shower under the ministrations of an enthusiastic nurse or physician. Furthermore this method fails to tell us how many individuals got the injections or how many got a complete series of injections. I have no idea what the actual ratio is of c.c.'s

of T-A or toxoid per person receiving a complete series.

Under the stimulus of actual figures health officers with a sense of responsibility strive to better a poor showing; those with a good one try to maintain it, if they cannot improve it. Records get children immunized in that way. Immunization figures enable us also to determine the effectiveness of the various methods employed in getting children immunized. By cutting out useless procedures we have that much more time for useful ones.

The drive I have previously mentioned as having been led by an optimistic estimator, reached its climax after 3 months of publicity. Talks to organizations and new articles were spread over this period with a not very well organized canvass near its close. The result was good. A month later the health officer of another city organized a campaign with 100 volunteer canvassers 16 days before the first clinic was to be held. His newspaper publicity started at the same time. The first clinic was held in the worst blizzard of the winter but despite this handicap the attendance strained the capacity of the arrangements. The results as shown by the records were somewhat better than the longer, more elaborate and more expensive campaign in the first city.

By tabulating and studying the results with varying educational methods, in varying quantities we were soon able to determine that the canvass and a public clinic were *the essential* elements in a drive; that elaborate newspaper propaganda got very little return without them; that school drives got school children but very few younger children; that dog teams, posters, lectures, letters, postcards, merely served as a background; that it took a face-to-face talk and the existence of a free clinic to get children to a clinic or the family doctor in appreciable numbers. The records

also showed that doctors immunized more children during an active drive with a public clinic being operated than they did in all the rest of the year; that the mass movement of children to clinics gave the impetus needed to overcome the inertia of procrastinating parents.

Records will also show which canvassers are successful and which unsuccessful in securing immunizations. Sometimes poor ones can be taught, sometimes they can be enthused into becoming good ones. If they cannot be, they may be good at something else.

The foregoing comments refer to the immediate uses of records. But there is a more remote and I believe a more important use. A year ago I read a paper before the Health Officers Section wherein I advanced the following hypothesis:

1. The attainment of a high degree of herd immunity among children 5-9 and 10-14, as evidenced by the injection of 3 doses of toxin-antitoxin in 50 per cent or more of the members of these groups, produces no definite effect on the diphtheria incidence in that community. Diphtheria if prevalent continues prevalent for a considerable period and declines gradually as it does when active immunization is not used. If not prevalent an outbreak of considerable proportions may arise.

2. However, when the immunization of approximately 30 per cent or more of the children under 5 years is superimposed, there is an immediate definite decline in the current prevalence, and if the community be free from the disease or if its prevalence be low, an outbreak is very unlikely to occur. In other words, there is a critical point in the under-5 age group which must be attained and sustained in order to affect the diphtheria rate favorably.

It should be clearly understood that the foregoing is a mere hypothesis—important if true. It is based on a limited number of observations within a restricted area. It requires further observations of a similar nature from a wider area. Such observations, to be of value, must be based on knowledge of

where the community started from as well as where it ended.

To determine the starting point means that records of immunization must be kept by the health department as a routine. Their everyday uses justify this. They should be classified by age, perhaps by certain areas, at regular intervals, and when unusual circumstances arise. Starting to collect immunization records after an epidemic has commenced is futile unless it is known that there were none to collect.

At least once each year the immunes must be re-classified by age. As previously remarked, children do get older. A record that stood at 100 per cent of the under-5 age group January 1, 1927, would have been exactly zero per cent January 1, 1932, if no immunizations had been done in the meantime. The important thing to the health officer is not where he stood a few years ago, but where he stands now. Reclassifying the ages is not difficult if a system be followed. That used by the New York State Health Department is described in the article previously referred to and in the *Rural Appraisal Form* for 1932. I know of none that is simpler.

While it is purposed to continue observations in New York State as opportunity arises, yet diphtheria outbreaks have become so infrequent that unless decided change occurs it will be many years before sufficient evidence accumulates to provide an ample test. There has not been what might be termed a "satisfactory" outbreak in the state since a year ago last winter and no area of high endemic prevalence for over 2 years. Of necessity, therefore, if this hypothesis is to be further tested in the near future, it seems it will have to be done elsewhere than in New York.

The Committee on Administrative Practice of this Association is interested in obtaining further data that will tend

either to support or refute this hypothesis. It is hoped that every county and city health department in the country will secure and maintain such records as will enable it to determine where it stands relative to diphtheria immunizations now and at any time in the future. If diphtheria becomes prevalent there should be available not only a record of the cases, but a record by age of the children who have had a full series of toxoid or toxin-antitoxin.

A health officer's duty is first of all to his community—as a community. He must consider his people and their diseases in the mass and be concerned with the individual primarily as he affects the mass.

If the injection of 80 per cent or even 100 per cent of the older children fails to stop diphtheria in the community,

the project has failed. It is not important that he has stopped the disease among school children; it is not important that every one of those injected has been Schick-tested and found negative. But it is important whether or not diphtheria continues to take its toll among the unprotected.

If injecting 30 per cent or more of the under-5 age group will stop diphtheria among all groups, that is the essential thing to do. If it is not true, we should find it out without delay. If it is only partly true we should find out what the modifying factors are. If it is true we should know it with certainty.

We will not be able to determine the point until we have available for study reasonably complete and reasonably accurate records of immunization.



# Inaugural Address\*

J. L. POMEROY, M.D., F.A.P.H.A.

*Los Angeles County Health Officer; President, Western Branch,  
American Public Health Association*

Mr. President, Honored Guests, Ladies and Gentlemen:

IT is indeed a great honor to be elected president of the lusty adolescent known as the Western Branch of our great American Public Health Association. It gives me great pleasure to accept this honor and I trust that I may be able to fulfil the obligations resting upon me in a satisfactory manner. Certainly it is important that those of us engaged in public health work in the western section of the North American Continent should have opportunity for exchange of views by coming together in an annual convention. Through such intercourse and exchange of ideas come much good and I sincerely hope that the future will show the steady growth in our development. The sympathetic and helpful attitude of the officers of our parent organization is stimulating and encouraging.

In reflecting upon the various points of view and attitudes of mind concerning our field of work an interesting if somewhat fantastic interpretation has occurred to me. During recent years I have been wont to look upon ourselves as workers on the great highways of life. Road building you know is an ancient and honorable profession. The old Roman Road of England is pointed to today with great interest. Road building requires a number of operations. The selection of a proper route,

the planning of the highway, the drawing of specifications and finally actual building operations. It is important that along the highway there shall be signs directing the traveler and warnings against dangerous detours. Maintenance and repair are also of great importance; and perhaps most important of all came into being the "bridge builder."

The great field of public health has many similar analogies to the profession of road building. There must be those who go ahead and blaze the trail, charting the way in the great unknown. Some work in the field of research studying better methods and solving the vexing problem of frequent defeats and analyzing our failures. Some are engaged in health education and place the sign boards along the highway of life. Many are engaged in what might be called maintenance and repair work. It is indeed true that there are many dangerous detours and bypaths tended by quacks, pretenders and cultists of many kinds, constantly seeking to lead the public from the safe and sane highway.

But whether we are engaged in the major work of planning or whether our walks are in the humbler paths, each group of workers in the field of public health plays a most important function not only in providing safe and sane highways but in keeping these roads clear of danger and swift of travel.

These thoughts have been suggested by an anonymous poem as follows:

\* Read before the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, Calif., May 30, 1933.

## THE BRIDGE BUILDER

An old man, traveling a lone highway,  
 Came at the evening, cold and gray,  
 To a chasm vast and deep and wide.  
 The old man crossed in the twilight dim,  
 The sullen stream had no fear for him;  
 But he turned when safe on the other  
 side,  
 And built a bridge to span the tide.

"Old man," said a fellow pilgrim near,  
 "You are wasting your strength with build-  
 ing here,  
 Your journey will end with the ending  
 day,  
 You never again will pass this way.  
 You have crossed the chasm dark and  
 wide;  
 Why build you this bridge at eventide?"

The builder lifted his old gray head:  
 "Good friend, in this way I have come,"  
 he said,  
 "There followeth after me today  
 A youth whose feet must pass this way;  
 This chasm that has been as naught to  
 me  
 To that fair haired youth may a pitfall  
 be.  
 He, too, must cross in the twilight dim,  
 Good friend, I am building this bridge  
 for him."

Looking backward we might well re-  
 view some of the great pioneers who  
 might be termed "bridge builders." Perhaps one of the most important of these was Florence Nightingale, that angel of mercy and cleanliness in the hospital. During the Crimean War at the barrack hospital at Scutari she demonstrated the great need for fresh air, cleanliness, and trained attendants in the care of the sick. She laid the foundation for the modern trained nurse. Next came the work of Louis Pasteur and his immediate followers who bridged the great chasm of darkness and death in relation to bacteriology. Joseph Lister in 1867 showed that infection in wounds could be prevented by antiseptics and by cleanliness, and the advent of surgical cleanliness, the supreme virtue of modern hospitals, dates from his time.

Perhaps that greatest and most appalling "grand canyon" of death, tuberculosis, might be said to have been spanned by Robert Koch and his followers in Germany through the discovery of the tubercle bacillus and its relationship to infection. In the conquest of diphtheria, special pathways and bridges for the feet of little children were laid down by Behring, Roux, Park, Schick and many others.

We cannot fail to mention with considerable pride our own Oliver Wendell Holmes, who even prior to the demonstration by Semmelweis, suggested that puerperal fever was a true infectious disease. This discovery lifted a tremendous burden from the women of mankind and might truly be said to make up one of the most important bridges on the pathways of life. In that great field of prevention of infection, the introduction by Jenner of vaccination against smallpox certainly must be mentioned as the laying of foundation stones. The very basis of all our modern work in immunology rests upon this noble experiment.

The pioneer work of Laveran with malaria, together with the work of Ross and finally our own Americans, Walter Reed and his associates at Havana, opened up the pathway of safety in dealing with disease carried by mosquitoes and insects. In this connection we must mention the name of another American, that of Ricketts, whose fundamental demonstration on ticks in the transmission of rocky mountain fever was of supreme importance in the west. It is romantic indeed to think that even the humble, obscure and remote pathways from the mountains in Montana to the jungles of Africa, can and shall be made safe through preventive medicine for those who tend the sheep and herd the cattle. How truly democratic is the field of preventive medicine which makes smooth the way not only for those in high places who



travel on the broad highways, but yea, even for those whose walks lead in the humbler and simpler bypaths of life.

In the field of intestinal parasites the names of those workers who have driven many rivets in these life-saving structures are too numerous to mention in detail. Perhaps most fundamental are the development of water supply purification methods, improvements in disposal of sewage, together with the clinical work on typhoid by Budd and others.

The early history of sanitation is closely linked with the names of Sedgwick, Burdon-Sanderson, and Kirkwood. Likewise the development of chlorine treatment of water by De Morveau of France and Cruickshank of England, together with the work of George W. Fuller in America, deserves special mention. The first steps taken by Wyatt Johnston, of Montreal, were the beginning which culminated in the development of standard methods of water analysis.

Closely connected with this subject of bridge building is the solving of problems related to the development of children in this country. The work of Holt, Jacobi and Josephine Baker on the clinical side, together with modern development of milk production and pasteurization can truly be said to have been epoch making. More lately the growth of our knowledge concerning vitamins, the refrigeration and handling of foods, have cleared many of the obscure and dangerous pathways for childhood and motherhood. Perhaps nothing is more fundamental to the health of mankind today than the development of means of purification of milk for human consumption, modern refrigeration and modern canning methods. In our southern states we cannot fail to mention the remarkable lifegiving work done by a host of

workers in the United States Public Health Service in dealing with hookworm, malaria, pellagra and many other diseases.

But our bridge builders have not alone been bacteriologists, chemists and research men! These men might be likened to those who test the factors of safety in our health construction work and point the way to methods, but after all the health administrator is the engineer who actually superintends construction. The names of Stephen Smith, Hermann Biggs, George M. Sternberg, William Gorgas, and to bring home to those of us in Southern California, L. M. Powers of Los Angeles, Stanley Black of Pasadena, and Fitch C. E. Mattison of Pasadena, are dear to our hearts. In this brief sketch let us take courage that even those of us who simply patch the worn places in the highways, and yes, those of us who are merely throwing hot rivets to the man higher up to ram home in this great structure, the bridge of life,—we too serve a fundamental purpose. After all, the fate of a nation rests upon the health of its individual citizens. The health officer who applies to the best of his ability modern preventive medicine in town and village carries the fate of the nation in his hands. Let us each therefore do his best to smooth the pathways, be they ever so humble, because after all without the pathways and secondary roads there can be no greater highway of life.

And so when the end comes and the Greatest Engineer of all lifts the draw bridge, may we pass into that final canyon which science perhaps never can successfully bridge with the consoling thought that we have done everything possible for our fellowman in rendering a service to help make the way safe for those who follow after us along the great highways of life!

# The Training of Health Personnel\*

W. S. LEATHERS, M.D., F.A.P.H.A., AND A. E. KELLER, M.D.

*Department of Preventive Medicine and Public Health, Vanderbilt  
University School of Medicine, Nashville, Tenn.*

THERE is perhaps no problem confronting the public health authorities of the United States of greater importance than to provide qualified health personnel. The development of county health work on a full-time basis is one of the great modern achievements in public health. Since the first full-time health unit was established in Yakima County, Wash., in 1911, this type of health organization has been carefully scrutinized, and based upon the results accomplished it has passed the experimental stage. At the close of 1931 there were 596 full-time county or district health organizations in 36 states. A large proportion of these have been established in southern United States, but it should be emphasized that such health demonstration centers are found at present in all sections of the country. As a result of this extension in health service and other factors, such as the expansion of state health departments and improvement in municipal health services, the demand for adequately trained personnel in this field has exceeded the supply. This problem has also become more acute because of the need for well prepared and experienced workers by voluntary health agencies.

It has been estimated that for each rural population unit of 20,000, theoretically, there should be 5 trained health workers, consisting of a health

officer, nurses, and sanitary inspectors, properly to meet the expected demand; and also that it will require as many as 300 physicians a year to supply the demand of health agencies.

The most deterring factors in securing trained personnel from among physicians are the probably inadequate educational facilities for teaching public health and preventive medicine in our medical schools. A large per cent of the health officers in this country should be graduates of medicine, but unless medical students are taught in a comparable way the preventive aspects of medicine it is not probable that the promising graduates of medicine will become interested in sufficient numbers to adopt public health as a career. A careful analysis of the facilities for teaching preventive medicine and public health to medical students has been made, and of the 60 medical schools included in this analysis only about 12 use facilities and employ methods for teaching this subject in a manner comparable with those for such subjects as anatomy, physiology, medicine, and surgery. The instruction in the remainder appears to be unsystematic and poorly organized. This phase of teaching seems to have received less attention than many subjects of relatively minor importance in the medical curriculum. In only a small number of schools does it seem that a broad concept of public health is developed or that the subject is being treated in a manner commensurate with

\* Read before the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, Calif., May 29-31, 1933.

its far-reaching importance. The frequent combination of preventive medicine and public health with departments of bacteriology and even pathology does not seem logical or sound from the pedagogic point of view, since a modern public health program is a dynamic function more closely related to the clinical branches of medical science. We wish, therefore, to stress the defect which exists today in this respect in teaching medical students and the serious consequences which will follow because of their lack of understanding of the principles of preventive medicine and the trends in the field of public health. Obviously, in considering the problem of the training of health personnel a fundamental need is to provide better facilities for teaching the undergraduate medical student the principles of public health. This would place him in a position to more successfully use his knowledge concerning the prevention and control of disease in general practice.

It is generally agreed that one of the great needs in public health education in this country is to supply trained personnel for local or county health departments. There is urgent need at the present time in different sections of the country for graduate courses in public health which will provide fundamental training and afford opportunity for experience in the field for those seeking positions in public health. There are approximately 3,079 counties in the United States. The ideal would be to have all of these counties individually or in groups organized on a full-time basis. It is, therefore, evident that some plan must be worked out by which more adequately trained personnel can be provided for the relatively smaller units of health organization. Such a plan should also provide opportunity for "refresher" courses with reasonable regularity.

This can probably best be accom-

plished by better utilizing the facilities in certain universities for training health personnel. From the point of view of convenience, economy, and stabilization of local health service, the establishment of graduate courses of instruction in certain medical schools, or graduate schools in coöperation with state and local health departments would contribute largely toward supplying this demand. We must not overlook the important fact that the health officer of the county becomes a general practitioner in the field of public health and consequently he cannot specialize in any one branch of preventive medicine.

There are as many as 5 groups of medical men who apply for positions as county health officers: (1) the recent graduate who is interested in a salaried position merely in order to save sufficient money to establish himself in practice; (2) the physician who has spent several rather unsuccessful years in practice and is desirous of making a change; (3) the practicing physician who has been fairly successful, but on account of the strenuous activities associated with practice is desirous of taking up public health work, being under the impression that he will be relieved of much of the stress and hardship incident to private practice; (4) the physician who has been successful in practice and who goes into public health because he has obtained from association with public health officials and from seeing the needs of his community an insight into this new field of medical activity and its possibility for service; (5) the young graduate in medicine who has had instruction in preventive medicine and who has a real interest in following public health as a career. At present there are not enough men in the last 2 groups entering the field.

Until within recent years the field of experience was the only school in which

most physicians gained their knowledge concerning public health procedure. While this has been necessary in the past, owing to a lack of facilities for adequate instruction, it should no longer be encouraged. The development of public health in the past 15 or 20 years has been so rapid that it is hazardous to place wholly untrained persons in the field.

In October, 1922, the International Health Division of the Rockefeller Foundation in conjunction with the State Health Department of Alabama established a field training station at Andalusia. The plan followed in this station was to place the candidate in the field immediately upon his arrival. Obviously, all the training was practical. He was associated in the field with some member of the county health department. The actual experience which the person obtained depended upon the amount of time he could remain at the station. If he remained long enough he would be assigned definite tasks or be given a field problem to study. All of his work was supervised and planned as far as possible by the director of the station. Those in training were also instructed concerning methods of handling reports, filing records, and given some idea with reference to the details of administration. Conferences were held on one afternoon a week to plan the work for the coming week. Usually some public health problem was discussed by the director of the county unit or by some member of the staff of the state health department. The primary purpose of the training station was to provide field experience and appraisal for newly appointed members of the staff of the International Health Division in preparation for the responsibilities of foreign service, and also to aid state health organizations in this respect. The two great schools of public health had just been established and

there was certainly a definite need for field stations for determining the suitability of persons for public health work.

Following the opening of this station two others of a similar nature were started, one in Mississippi and another in Ohio. Somewhat more recently a fourth training base was established in Michigan in connection with the state health department. These training stations represented an attempt to train health personnel by a more or less intensive field method. During the first 5 years 283 physicians were enrolled. Of those trained during this period in Alabama 13.6 per cent did not receive the approval of the director. These stations served a valuable purpose. This method of training health personnel has stimulated interest concerning the need. Such training stations have been discontinued. There are, however, a few states which are endeavoring to provide limited field experience for new appointees before entering upon their work.

Since the problem of training health personnel is one that confronts each state health organization, there may be some value in recounting the essential advantages and disadvantages of the field training station.

To enumerate the advantages:

1. Physicians who would probably have gone into some other field of medicine may be induced to enter upon public health work.
2. These stations have also served to awaken an interest and enthusiasm in public health and have given to those undergoing training a better conception of the scope of preventive medicine.
3. The individual has obtained a better idea of the relative values of the various public health procedures.
4. It has been a means for giving physicians who were interested in going into public health as a career an opportunity to determine whether or not they were adapted to this phase of medical service.

What are the disadvantages of the field training station?

1. These stations have been placed in rural counties where there is a representative health organization usually consisting of a 4-person health department, and the lack of personnel for proper supervision and teaching has been a handicap to efficient instruction.

2. It is practically impossible to carry on a balanced county health program and at the same time assume considerable responsibility for teaching unless additional personnel is provided.

3. A lack of transportation facilities is also a serious handicap.

4. Many of those who register for training are physicians who have been out of college a number of years and but little opportunity is afforded to review the fundamentals of preventive medicine and public health.

5. The kind of training received depends upon the time of the year and also the activities in progress at the time the physician comes for training.

6. No definite systematic instruction in the sense that it is given in a university is attempted. An effort is made to teach and to show what is meant by a balanced county program, but even though this is attempted the time is inadequate to give one the essential knowledge for outlining a program in carrying on county health work. These disadvantages seem to confirm the idea that a more intensive and thorough preparation is required.

During the past decade or so courses of instruction in public health have been given in various ways. They have ranged from so-called institutes of a few days' duration to a full course leading to a degree of Doctor of Public Health. All agree that something more than a didactic course is necessary to prepare a man for a career in public health. Any plan of instruction should include a limited supervised field experience. The principles employed in actual practice must be stressed.

To carry out such an idea would necessitate coöperation between educational institutions and administrative health agencies. Such an arrangement is necessary in order that proper standards and methods of instruction be developed and maintained. We are, therefore, of the opinion that courses in public health should be organized in a

few universities representing different sections of the United States so that systematic instruction is made more available to those who may wish to enter upon public health. It is well to remember that the undergraduate student of medicine today is a graduate of an accredited high school; he must have had not less than 2 years of college work, and a large number of candidates for the degree of Doctor of Medicine have obtained the bachelor's degree; added to this is 4 years in a medical school and then from 1 to 3 years of internship before entering upon his career, whether it be in general practice or public health. Those who desire to specialize in some phase of public health may in addition devote from 2 to 3 years to study further in a school of public health. However, experience shows that in this transitional period in public health development in the United States it is necessary to afford opportunity for physicians and other types of personnel to secure more limited courses of intensive training in the state, or at least in the section of the country, in which these persons wish to engage in public health work.

It is for this reason that we have attempted to develop a postgraduate (graduate) course in public health in Vanderbilt University in coöperation with the Tennessee State Department of Public Health. By such an arrangement the resources of a teaching institution can be coördinated with the health department. The teaching force is drawn from the Vanderbilt University School of Medicine, the Tennessee State Department of Public Health, and the local health departments. This course has been established on a satisfactory basis and has been given at reasonably regular intervals since 1928. The primary purpose of the course is to fit graduates of medicine for positions as county health officers. It is intended to be an introduction to the subject; to

give the physician a working knowledge of public health; and to give him a better foundation upon which to build. Two main objectives are recognized: (1) to acquaint the medical graduate with the field of public health, its possibilities, its problems, and methods of work; (2) to develop the point of view of the health officer. This course affords an opportunity to review certain fundamentals and at the same time give considerable attention to the administrative side of public health. During this period instructors are able to estimate a physician's potentialities as a county health officer.

The completion of the postgraduate course offered requires 12 weeks, divided into 2 periods of 6 weeks each. The first period consists of lectures, demonstrations, laboratory work and group conferences. It has been found necessary to give some clinical instruction. This is important because it is desirable for a local health officer to know not only preventive medicine and public health but also clinical medicine, at least to the extent of being acquainted with diagnostic methods, particularly in the field of acute communicable diseases. The second period is actually devoted to field work in a well-organized local or county health department. During this period the men in training enter into the regular work of a county health department. In doing so they follow a definite schedule and record their observations. Each man or group of men is given a special problem to study. This usually consists of a sanitary survey of some small town or community. Seminars are held at regular intervals and at the end of the course opportunity is afforded for a discussion of the results of the special assignments. The completion of a course of this kind, or evidence of equivalent instruction and experience, is required by the Tennessee State Department of Public Health for employment as director of a

full-time county or district health department.

During the course approximately 500 hours are devoted to intramural and extramural instruction. The following table will give an idea of how the time is divided.

#### NUMBER OF HOURS OF INSTRUCTION

##### FIRST PERIOD—INTRAMURAL (CLASSROOM)

<i>Subject</i>	<i>Number of Hours</i>
Public Health Administration (General)	81
Communicable Disease Control	48
Sanitation	37
Epidemiology	15
Vital Statistics	22
Maternal and Child Hygiene	15
Medical Zoölogy	12
Public Health Laboratory	9
Industrial Hygiene	7
Mental Hygiene	3
	<hr/>
	249

##### SECOND PERIOD—EXTRAMURAL (FIELD)

County Health Departments	192
Sanitary Survey	38
	<hr/>
Total	479

The most important branches of preventive medicine and public health are emphasized.

From personal experience with those who have registered for instruction in these courses, one is led to conclude that the training which each man received has been a factor in his success. Of the men who have taken these courses (more than fifty), all except 3 have continued in public health. They have been particularly successful in retaining the appropriations for the work, even under the present economic conditions. In fact, in some of the counties the appropriation has been increased. The indications are that this plan of training has proved of definite value and has made a contribution in providing better trained health per-

sonnel. We are well aware of the fact that such a course can only be considered as an introduction to public health from the standpoint of specialization. If given for a period of not less than 5 months or possibly a year it would be more satisfactory.

The training of personnel for public health work must be stimulated by the official administrative health agency of each state. However, based on our experience in Tennessee it would be unwise and indeed impracticable for a state health department to develop a plan for training health personnel without the coöperation of an educational institution which has the facilities to undertake this task. On the other hand, it would also be unwise and unreasonable for a medical school or university to assume responsibility without the coöperation of state and local health organizations. It is, therefore, necessary to have a coöperative arrangement between the agencies which will provide the faculty and facilities for systematic instruction in the class room, laboratory, and clinic, and also to have supervision in field work by the staff of a well-organized county health department. In offering postgraduate (graduate) instruction to health officers it has been my experience that the major responsibility in providing the curriculum and facilities for teaching should be assumed by a department of preventive medicine and public health of a medical school or possibly graduate school. This is to stress the point of view that in giving courses of instruction the university is the logical place in which to head up such an organization and it should assume definite responsibility for administering a course of this kind in coöperation with state and local health organizations. The state health department can perform well the following functions in such a plan: (1) develop an appreciation of the need for training health personnel; (2) assist in mak-

ing arrangements for such training; (3) provide the facilities for field work; (4) insure high professional standards on entering upon health work.

We have referred especially to the instruction of those who may be chosen for health officers. We wish now to give brief consideration to the training of sanitary inspectors. This has been a serious problem to the administrator of state and local health departments. Much of the success of a local health unit depends upon the type of sanitary inspector employed. In most places at present the inspector receives no preliminary training before being placed in the field. He is often chosen on a political basis. Many have had but little educational opportunity. Obviously better provision should be made for the preparation of this type of personnel.

In an endeavor to improve this situation, the State Health Department of Tennessee has worked out a plan for training sanitary inspectors in coöperation with the State University in Knoxville. The requirements for entrance into this course are the same as for entrance into the university. The applicants are recommended by a representative of the State Health Department subject to the approval of the committee on admissions of the state university.

The course, as given at the present time, extends over a period of 15 weeks, 13 of which are spent at the University of Tennessee and in the Health Department of the City of Knoxville, the other two in a rural county health unit. The course is divided into 2 parts, (1) didactic, consisting of 160 hours; (2) field work, consisting of 420 hours not including the 2 weeks with the county health unit. This course attempts to teach the fundamental subjects connected with sanitation and at the same time gives the point of view which a sanitary inspector should have. The

following phases of sanitation are covered:

1. Sewage disposal
2. Water supplies
3. Mosquito control
4. Milk sanitation
5. Control of communicable diseases
6. Practical demonstration in bacteriology
7. Refuse disposal
8. Rodent, insect and vermin control
9. School sanitation
10. Statistics.

Most of the men who have completed this course are now in the employ of the state or county health departments. Doctor Wilhelm has made the following statement in regard to the results obtained.

In the beginning the Tennessee State Department of Health and the University of Tennessee felt it was a new departure and entirely experimental, but after completing 4 classes and experiencing the type of work these men have done with the county health units to which they have been attached, these institutions feel that it is a sound way to train sanitary assistants and feel well repaid for the effort put forth.

The other type of health personnel which should be given consideration is the public health nurse. An effort is now being made in Vanderbilt University as well as other institutions to teach the undergraduate nurse the principles of prevention in the undergraduate curriculum just as is being done in a number of schools in the instruction of medical students. In this way the student nurse should have a fair knowledge of hygiene and preventive medicine prior to entering upon special courses required for training in public health. It is imperative that the preventive point of view be emphasized throughout the curriculum of the undergraduate nurse and that she be made to realize her responsibility in the promotion of individual and community health. During the past decade or so special courses have been offered in a

number of institutions for the training of public health nurses which include theoretical instruction, laboratory work, and to some extent field demonstrations. Within recent years there is obviously a growing interest to establish field training for public health nurses as a part of their instruction both in the undergraduate and graduate curriculum.

The nurse fills an important place in the scheme of public health and too little attention has been given to the preparation of nurses who wish to enter public health work. In the School of Nursing of Vanderbilt University a course has been provided for training public health nurses, including such subjects as public health administration, the control of communicable diseases, prenatal and infant hygiene, school hygiene, mental hygiene, dietetics, and other phases of medical and public health service which are needed by a public health nurse in carrying out her part of the program in a public health organization.

During the early period in the development of public health in this country it was exceedingly difficult to secure trained personnel. It has been necessary frequently to follow a course in selecting personnel which could not be regarded as altogether satisfactory. Public Health has, however, passed the experimental stage and we have now entered upon an era which demands trained personnel. Public health has become a specialized phase of medical service requiring trained health officers, trained public health nurses, trained inspectors, trained sanitary engineers, and well selected subordinate personnel for clerical duties.

Opportunity is afforded now for one to get special preparation in 2 great schools of public health, Johns Hopkins and Harvard Universities. Graduate courses are being offered higher degrees also in several other institutions. However, there is as yet an insufficient



emphasis placed upon postgraduate instruction of a university type for those who wish to gain fundamental training before entering upon public health. This need not be so extensive and intensive as may be desired by those who wish to follow the more specialized phases of public health.

As has already been emphasized, local full-time health department personnel should be trained as practitioners of public health, and at least in this stage of public health development in the United States we cannot expect, nor should we require, that physicians who may wish to become health officers devote as much as 2 years in preparation for such service. We are endeavoring to differentiate between the individual who assumes responsibility as a general practitioner of public health and one who may wish to specialize in some field of public health service. The ideal plan would be for every one to receive specialized training at least from a theoretical standpoint, but we are confronted with a practical situation which must be dealt with in a reasonable and judicious manner. It is for this reason that emphasis is being placed upon the

need for a type of instruction which will provide a more efficient health personnel in meeting present demands with the hope that the qualifications, certification and licensure of health personnel in the United States will in the near future be more definitely established.

The progress of public health work will depend in a large measure upon the type of personnel selected for such service and this will also be an important factor in stabilizing public health organizations. There has been remarkable development within the past decade or so in providing facilities for public health work, but the facilities for training health personnel have not been made available in different sections of the country so that those who may wish to enter upon public health as a career can gain the instruction and practical experience which is needed. This is a need that should be supplied.

#### REFERENCES

1. Leathers, W. S. Development of the clinical concept in teaching preventive medicine. *Journal of Association of American Medical Colleges*, 7:86 (March), 1932.
2. Mountin, Joseph W. The training of health officers. *U. S. Public Health Reports*, 45:2378 (October 3), 1930.

# The Relationship of Public Health to the Doctor in Private Practice\*

CHARLES W. DECKER, M.D.

*Health Officer of the City of Los Angeles, Calif., one time Col. M. C., U. S. Army; Instructor in Military Surgery, Medical School, University of Southern California, etc.*

THIS has been more or less a controversial subject for many years. Every period of depression stimulates its discussion. The prolonged economic depression now prevailing has acutely accentuated this problem, for physicians are unable to collect fees from patients who have no money.

Public Health as a field of medical endeavor is of comparative recent development. In 1864 New York City appointed saloon keepers and ward heelers custodians of public health as political rewards, and the service rendered was what one would expect from such personnel. The day has passed when a drygoods clerk or a bright young man from a banking house is considered capable of handling problems of public health.

Health officers themselves have not been blameless in delaying a better understanding of their relationship to general medicine. We can all recall the type of health officer, who, like the Pharisee, when he thanked God he was not as other men were, thanked God he was not as other doctors were. Only by recognizing that public health is a field of special practice of preventive medicine as distinctively a specialty as

surgery, otology, or ophthalmology, can we probably orient ourselves in the general group of scientific organized medicine.

The curative field of medical endeavor reaches back into the earliest historical records of man. The hieroglyphics of the Egyptians and the clay tablets of the Babylonians contain descriptions of therapeutic practice of their day. Public health is comparatively of so recent origin, that its very newness has resulted in diversity of expression regarding its purposes and even the ethics of its aspirations.

It was but natural that with the dawning of community consciousness of public health responsibility, the most available personnel should have been utilized to carry on the not too well understood sanitary program. Quite generally throughout the East the City Poor Doctor readily stepped into service as the health officer. In our newer Western communities, medical care of the indigent sick grew up with public health, and little if any segregation has ever been made of personnel engaged in the preventive practice of public health, and those in purely curative medicine.

School health and development work is often criticized as an additional burden that public health puts upon the tax payer. This is an unfortunate mis-

---

\* Read before the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, Calif., May 30, 1933.

conception of what school health and development really is. It should more properly be designated as corrective physical education. The child with a visual or auditory defect, damaged heart, neurological impairment or deformity needs the care and guidance of skilled physicians, who are at once medical specialists and trained educators. The physically handicapped child requires this expert supervision if it is to develop into a useful citizen, instead of a charge later upon its family or public charity. The budget for corrective physical education should no more be charged as public health expense than any other part of the curriculum.

When declaration is made that public health should concern itself strictly with control of communicable disease, leaving therapeutics to private practice or welfare clinics, there are those who feel that all romance and interest would be removed from public health work. Glorious as have been the discoveries of curative medicine in alleviating the sufferings of mankind, equally glorious and romantic have been the sacrifices of our army medical and public health officers, who with their lives paid for the knowledge that now gives us control of yellow fever, malaria, typhus and Rocky Mountain spotted fever.

In California, statute law specifically designates counties as responsible for welfare,—food and shelter and medical care of the indigent sick. Such being the law, our City Attorney has expressed the legal opinion that we may no longer expend funds of our public health budget upon welfare. The Los Angeles County Welfare Department has some 17 million dollars in its budget, entirely separate and apart from County Public Health, and can properly provide required care. When public health can eliminate entirely

curative practice, excepting only treatment of indigent sufferers from communicable disease, from its field of labor, it will be relieved of the most frequent cause of criticism from the physician engaged in private practice. Doctors, and not infrequently the medical societies, complain that public health physicians immunize and vaccinate children to the detriment of the private physician's income. Public health can not abdicate its responsibility to safeguard the health of the community. We can, however, meet the criticism by agreeing to discontinue our immunization and vaccination services, when and to the degree that the private physician accepts his responsibility by doing this preventive work. We should place the baby requiring immunization in the private physician's lap, with the observation that we were but its guardians, and gladly restore it to its natural parents. Every doctor has a degree of responsibility in protecting the public health, and when he recognizes this, we will have more money and personnel to devote to sanitary services outside his field of activities.

It has been the endeavor of the Los Angeles City Health Department to cultivate friendly understanding with organized medicine as represented by our County Medical Association. This has happily been accomplished and at our request the Board of Councilors of the Los Angeles County Medical Association have constituted their Public Health and Public Relations Committee the Medical Advisory Board to the Health Officer. With such an intimate affiliation between public health and organized scientific medicine there can be built up in years to come an ever better, happier and more useful public health service, recognized, as it should be, as an ethical specialty in the broad field of medical practice.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZÝCK P. RAVENEL, M.D., *Editor in Chief*  
AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMANN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## THE INDIANAPOLIS MEETING

WE have just sent out a News Letter containing the call for the meeting of our Association in Indianapolis, October 9-12, to which more than usual interest attaches. We met there last in October, 1900, and it was there that Walter Reed, Chairman of the Army Commission sent to Cuba, to study yellow fever, made the first announcement of his success in transmitting the disease by the mosquito now known as the *Aedes aegypti*. That meeting is rightly considered one of the most notable in the history of our Association. While every member of the Commission is now dead, a few of those who took part, almost all as volunteers, are still living, and we are making every effort to have some of them present at the meeting. This demonstration of Reed and the Commission has been justly described as the most important contribution to science ever made by an Army surgeon, and as being second only to anaesthesia in its benefits to the human race. To this opinion we heartily subscribe.

It is proposed to have a special session devoted to yellow fever in which the part the Army Commission played will be discussed, and the Surgeon General of the Army has been invited to give the leading address on this occasion, and it is our firm opinion that he is the proper person to do this. Unfortunately, one or two of those who took part in these experiments, who are still living, through the infirmities of age and disease will be unable to be with us, but in spite of this, their names will be mentioned and due honor paid their courage and self-sacrifice.

As far as this country goes, yellow fever is a disease which has been confined practically to our southern states, in spite of the terrible epidemic of 1793 in Philadelphia, and some outbreaks even farther north. It is hoped that this fact will not lessen the interest of those from Canada and our northern states. There

can be no question that the studies conducted by Reed have not only cleared up the situation in regard to yellow fever, and saved thousands of lives, as well as millions of dollars through the opening of ports which were previously closed from spring until a killing frost in the fall, but have also been fertile in bringing about methods of study and researches which have had a far-reaching influence.

Yellow fever, from being the greatest menace of the tropics to our country, now occupies an almost negligible position, and never again will North America suffer an epidemic. Further than this, the studies carried out in Africa under the Rockefeller Foundation have added much to our knowledge, so that this disease, which was so mysterious even within the memory of most of us, is now an open book, and we are well on the road to the discovery of a practical vaccine by which non-immunes may be protected. There is no place in medical science for local or even national prejudices, and the same is true of science in general, though illness and death bring nations even more closely together than any other factor.

For many of us, a visit to Indianapolis will bring back delightful memories of Dr. John N. Hurty, for so many years the genial and efficient Health Officer of the State of Indiana. He was our host in 1900, and only to our younger members is it necessary to say that he embodied all that is best in what is implied in the word "host." Dr. Hurty was more than a health officer. He was a poet and philosopher. On another page (796) we give one of his poems which has been circulated far and wide, and has done an enormous amount to make people realize what preventive medicine and public health mean.

This issue of our Journal has the usual information concerning routes of travel by train, automobile or airplane, and it is only necessary to emphasize the unusual features of the meeting in Indianapolis, and to urge as large an attendance as possible, if for no other reason than to honor those who have done so much for humanity as well as for commerce.

### CHARLES PORTER, M.D.

THE many friends of Dr. Porter among the membership of the American Public Health Association, of which he is an Honorary Member, will be delighted to know that he has been unanimously elected President of the Society of Medical Officers of Health of England. The apparent delay in giving him this honor was due entirely to his modesty, since for some 10 years he has been repeatedly nominated, and has as often withdrawn his name in favor of some colleague. This year, four nominations were made, but the other three withdrew in favor of Dr. Porter. He will assume office on October 1.

Dr. Porter is so well known that it seems unnecessary to give a list of the degrees and honors which he holds. It is suitable to mention, however, that in addition to his medical degrees, he is also a Barrister-at-Law, and holds the office of Medical Officer of Health of St. Marylebone, London. His other qualifications may be found in Who's Who.

He has held many positions of honor in the various associations with which he is connected, and has had a large experience as a lecturer and teacher, as well as an adviser in outlining studies in hygiene for other universities, and also on

examining boards, such as that for the Royal Sanitary Institute and Sanitary Inspectors' Joint Examination Board. He has been a prolific contributor to various journals on public health and, for a number of years, has been Honorary Editor of *Public Health*, the official organ of the Society of Medical Officers of Health of England.

Those readers who have not had the pleasure of meeting him—for indeed his visits to this country have been entirely too few—will recognize his letters in our Journal. At our Montreal meeting, at his suggestion, an arrangement was made by which he contributes to our Journal, and the editor of our Journal contributes to *Public Health*. The section of *Public Health* under the head of "Ut Ita Dicam" would alone make a man's reputation as a writer. Not only does it cover every item of interest in public health, but it is written with such a keen wit, tinged with a bit of cynicism, as to make it a delight to all. *Public Health* will continue to be edited in Dr. Porter's office at St. Marylebone, Dr. James Fenton, who has been associated with him in at least one publication, having been appointed editor.

In addition to Dr. Porter's articles for journals, the following publications are credited to him: Sanitary Law and Practice (Robertson and Porter); Sanitary Law (Porter and Fenton); School Hygiene and the Laws of Health; Elements of Hygiene and Public Health; The Future Citizen and His Mother; and the Parkin Prize Essay on Cholera.

Our readers will be glad to know that he does not look forward to discontinuing his letters. It is a peculiar pleasure to the editor of our Journal to be able to make this announcement authoritatively. His personality has made for Dr. Porter hosts of friends in every country where he is known, all of whom will take pleasure in knowing of the honor which he has at last accepted. This Journal adds its own congratulations and also felicitates the Society on obtaining his services as President.

## EPIDEMIOLOGY AND AIR TRAVEL

WE have several times alluded to the problems connected with the transmission of infectious diseases from one country to another by the increase in air travel. It has long been recognized that as a rule contagious diseases travel at the same rate as means of human communication. For a long time infected man was considered perhaps the only danger, and the first international sanitary convention held concerned the prevention of the carriage of Asiatic cholera along caravan routes.

As early as 1585, we find that the City of Aberdeen took precautions "in case any infectit person might arrive or repair by sea or land to this brough," and erected gibbets for the punishment of those who harbored or even aided such persons. In 1663, Pepys tells of the arrival of plague at Amsterdam brought by a ship from Argier, and says that the King of England purposes to forbid Dutch ships from coming into the Thames. In those days of sailing vessels, practically all diseases which might have been carried by ships passed the period of quarantine (40 days) on the voyage. With the coming of steam, conditions were tremendously changed, and now again with airplanes, an entirely new problem is presented. Speed of transportation is, other things being equal, equivalent to reduction in distance.

The Health Organization of the League of Nations, the International Air Navigation Commission, and the International Hygiene Office in Paris have already had a number of meetings to consider the problems which have arisen. Reports have been made by several ministries of health, and measures have been taken by some countries against the exportation and importation of diseases by airplanes.

Some of the most interesting experiments have been done by the U. S. Public Health Service, which has shown that a number of mosquitoes, including some of those known to carry disease, may be transported easily from tropical countries to the United States, and also that occasionally these mosquitoes will bite human beings at an elevation of 3,000 feet. Not only have mosquitoes traveling by their own volition, so to speak, been found arriving in this country, but when stained mosquitoes are liberated in the cabins of airplanes, a considerable number of them survive the trip, and are found in good condition on arrival. There can be no question that other insects known as disease carriers can survive airplane travel in the same way, and theoretically, at least, some of them can find more comfortable quarters in planes than mosquitoes.

Among the infections which seem to be the greatest menace to the world are yellow fever, plague, Asiatic cholera, and smallpox. The incubation period of these diseases is respectively 6, 6, 5, and 14 days, while the airplane trip between the countries in which these diseases are endemic and England, for example, runs from 6 to 3 days. With constantly increasing speed and the likelihood that airplanes may soon fly through the stratosphere, where speeds will be still greater, the menace will be correspondingly increased.

Yellow fever is now known to be endemic on both the east and west coasts of Central America, the north and part of the east coast of South America, and a large part of the western coast of Africa. So far it has not been carried from west to east, for reasons which are not well understood, the vector mosquito seeming either unable or unwilling to make the trip. On the other hand, the potential geographical incidence of the *Aedes aegypti* includes parts of both coasts of North and South America, Africa, India, part of China, and the Straits Settlements, and the east coast of Australia. From what we know of the history and spread of malaria, there seems to be good reason to believe that should a case of yellow fever be carried into any of these areas, the disease could and probably would be propagated and possibly become endemic. When we think of the hundreds of millions in India, South China and the Straits Settlements among whom epidemics might occur, the possibilities are appalling.

Plague is indigenous in India. It has been said that this country is its natural home and habitat. It is constantly present in the South of China and some of the Straits Settlements, as well as in China. In the past, it has been repeatedly brought by ship and by caravan routes to the West. New relationships bring new responsibilities and new dangers. Becoming a world power has brought to the United States responsibilities and dangers which were never thought of only a few years ago. Trade must be carried on. So far we have been able to overcome the principal diseases found in the trade routes of the world, and there is little doubt that we will accomplish the same with respect to airplane travel. Until now the limitations and expense of traveling by airplane have been such as to limit the risks. Only the richer and better class of people, as a rule, travel by airplane. It would surprise no one, however, to see air travel become much cheaper through the introduction of planes which would carry 100 or more

passengers. Indeed, in the United States, along some routes travel by air is at present cheaper than by rail, when the cost of meals, parlor cars, etc., are taken into account.

We are entitled to a great degree of satisfaction in knowing that several leading countries, such as America, England, Germany, and France, are well aware of the problems and are actively studying them. The work of the Rockefeller Institute in developing a vaccine against yellow fever is also reassuring.

These and other problems are considered in a very timely volume,<sup>1</sup> which includes maps showing the distribution of several diseases and the habitat of carrier mosquitoes for them, and also measures which should be adopted against the transmission of these diseases by airplane. It is high time for us to go beyond regarding the airplane as a curiosity and a wonder, and to recognize that it has come to stay as a means of transportation.

#### REFERENCE

1. *Epidemiology in Relation to Air Travel*, by Arthur Massey. London: H. K. Lewis and Co., Ltd., 1933.

Sixty-second Annual Meeting of the American Public Health  
Association, Indianapolis, Ind., October 9-12, 1933,  
Headquarters, Claypool Hotel



## LETTER FROM GREAT BRITAIN

### BRITAIN'S PREMIER HEALTH CONGRESS

The annual congress of the Royal Sanitary Institute—which, as I believe I have already mentioned, corresponds to the conference of the American Public Health Association—was held this year during the week June 17–24. This was somewhat earlier than usual on account of the fact mainly that the venue was Blackpool, a seaside health and pleasure resort and a popular “congress town” in the county of Lancashire, where the season is at its height in July, the usual meeting time, and in July accommodation for other than pleasure seekers is difficult to secure. For the reason that the Minister of Health had advised local health authorities that he would not approve the payment of the expenses of more than one delegate to this or any other conference, it was expected that the attendance would be much below that of previous years. Curiously, this was not the case, the official returns showing the actual number registered as 1,353, as against 1,389 in 1932. So far as health officers are concerned, the impression gained was that there was little or no falling off, all or nearly all of those one expected to meet being encountered here or there at functions or meetings. Of delegates from overseas there was a goodly number, including four representatives of the United States of America. Amongst these I was particularly pleased to find present, representing the Government, Dr. John McMullen, Medical Director in Supervisory Charge, European Activities, and stationed in Paris; and Dr. F. J. Halpin, Passed Assistant Surgeon, United States Public Health Service, now at the Consulate in London. As

this is some two blocks from this office we meet only at congresses held in the provinces. In addition to Dr. McMullen and Dr. Halpin, there attended from the United States of America a representative of the Massachusetts Department of Public Health, James L. Tighe, and Professor Felix d’Herelle of Yale University. Dr. Richard A. Bolt of Cleveland, Ohio, now in Europe studying maternity and child welfare provisions, in Germany particularly, under an award from the Oberlaender Trust, interrupted his enquiries in Berlin to attend the congress, and helped very greatly by taking part in several of the discussions. As he is attending also what is called—without, it would seem, much sense of euphony—“The Sixth English-speaking Conference on Maternity and Child Welfare,” which opens in London, and a pediatrics conference later, there will be further opportunities of seeing something of him. Amongst other countries sending delegates were China, Costa Rica, Egypt, Hungary, Iraq, and Italy. Some of these and others from overseas British dominions we had the pleasure of hearing at a luncheon given to overseas representatives, a function which is perhaps the most attractive of the several gatherings held during the week.

### MATTERS OF MOMENT

Meetings during the course of the congress were very numerous, and a multitude of papers were read and discussed at the various sections and conferences. The attendances in certain cases were very large: at one section, for example, when housing questions were under consideration, over 400 were present. The Preventive Medicine and

the Maternity and Child Welfare Sections, always very popular, brought together at times about 300 people. At the former the two main subjects considered were "A General Medical Service for the Nation" and "Psychological Problems in Industry." The former is a question that is exercising many minds at the moment and has arisen, as it was bound to arise, out of the operation of the medical benefits under the National Health Insurance Acts. The British Medical Association has attempted to draft a scheme satisfactory both to the medical profession and the people. The section was fortunate in having Sir Henry Brackenbury, Chairman of Council of that body, as President, and Dr. Alfred Cox, formerly Secretary, as opener of the discussion. The general view expressed was favorable to the provision of a national service, and quite a number appeared to regard the British Medical Association scheme, as propounded by Dr. Cox, as suitable, or at any rate not unsuitable. The opening papers on "Psychological Problems in Industry" came from a professor of psychology (Prof. Pear, of Manchester University), the managing director of a large department store in Liverpool (F. G. Marquis, M.A., M.Sc., of Messrs. Lewis & Co.), and the medical officer (Dr. Leonard P. Lockhart) to the Boots Pure Drug Co. Talk on psychology and problems connected therewith can be immensely fascinating, and these three papers were very greatly to the liking of the listeners, though many did not seem to feel that they were able to do much about it when all the reading and discussing ended. Of the delegates, 2 or 3 hundred chose to attend the Maternity and Child Welfare Section instead of the Conferences of Medical Officers of Health, or Engineers or Surveyors or the Veterinary Hygiene or National Health Insurance Sections or the Section of Architecture, Town Planning and Engineering.

#### THE MATERNITY AND CHILD WELFARE CONFERENCE

The Maternity and Child Welfare Conference in London, to which reference has been made, now in its sixth year, is one of the events of National Baby Week which falls usually in the first week in July. Primarily the responsibility for the organization of the conference is on a voluntary body known as the National Association for the Prevention of Infant Mortality, though a large number of other bodies concerned in infant and child welfare take part also. The President on this occasion was Sir George Newman, of the Ministry of Health. Responsibility for each of the sessions is placed upon one of the organizing bodies, and as a result this year, as usual, a considerable variety of subjects passed under review. The scope and advancement of ante-natal care, for example; the care and protection of illegitimate children; work on behalf of crippled children; tuberculosis amongst children; and the diet of the child after the period of milk feeding—all of these subjects were opened by persons of repute, and, as the audiences were largely lay, considerable enthusiasm was shown and there was a deal of useful discussion. A feature of the meeting was a clinical course for medical practitioners, arranged partly by the Maternity and Child Welfare Group of the Society of Medical Officers of Health. This included visits to and demonstrations at various hospitals and institutions, and proved very attractive.

#### THE TRAINING OF THE NURSE FOR THE NURSERY

These had an opportunity of learning something of the need for and advantages of maternity hospitals or homes in connection with maternity and child welfare schemes, and of the propriety of providing special training and qualifications for girls desirous of

becoming nursery nurses and taking charge of other people's children. This is a question in which the Royal Sanitary Institute is particularly concerned, since one of its chief activities is the examination and certification of persons seeking to secure appointment as non-medical members of public health departments or in other positions where a knowledge of hygiene is a desideratum. It was because the Viscountess Erleigh has had this as one of her chief interests that she was chosen President of the section, and led off with an address that helped to cause the discussion to assume a very lively importance. After the case for maternity hospitals or homes had been completely proved, the section discussed the question of rheumatic infection in childhood, one which is giving rise to a considerable degree of anxiety at the moment and in regard to which many health and education authorities are desirous of obtaining guidance. In the course of the discussion many very interesting and useful views were expressed by persons engaged in an endeavor to deal with the problem, and it is possible to believe that as a result of this meeting a certain amount of advance in the direction of devising a suitable scheme was made.

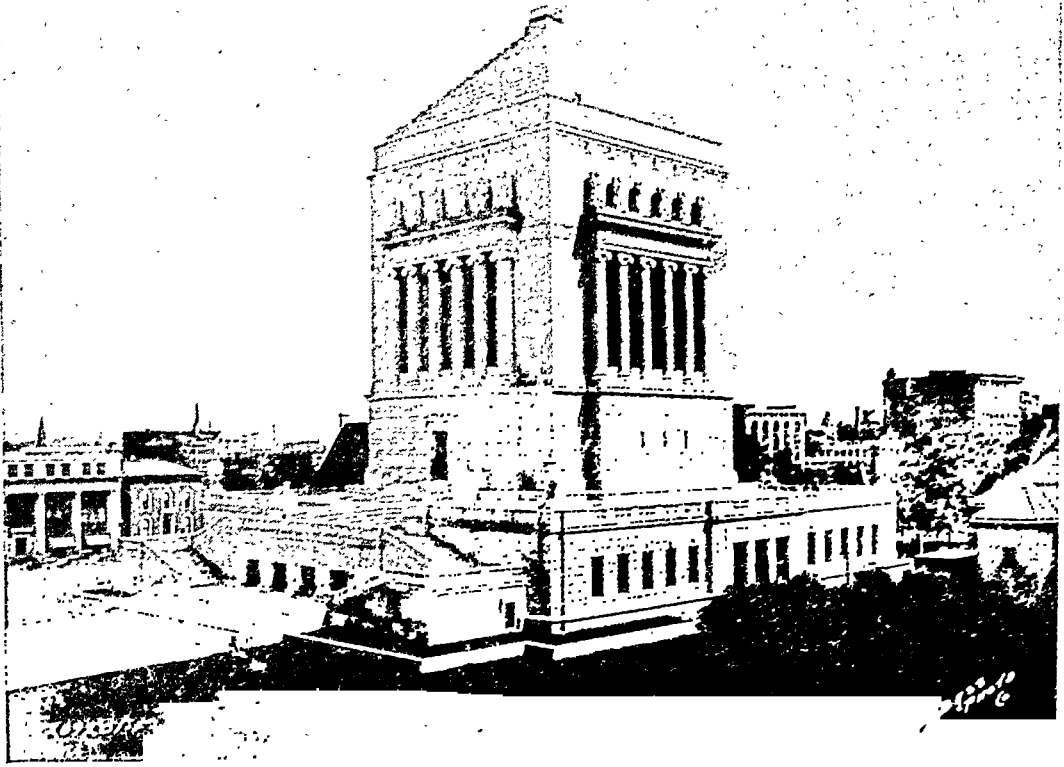
The final subject on which pronouncements were made was the need for the establishment of orthodontic clinics as part of school medical treatment schemes. The time at disposal allowed for little more than the reading of a paper descriptive of what is claimed to be the first clinic in this country, but opportunity may be found later for further communications on the subject.

THE PRESIDENCY OF THE SOCIETY OF  
MEDICAL OFFICERS OF HEALTH

The Society of Medical Officers of Health, in accordance with custom, towards the end of May selected its President for the next session. The rules provide that each Branch may nominate an individual, and on this occasion four names were put forward. Of the four, three most generously withdrew in favor of the fourth, and as he is an Honorary Fellow of the American Public Health Association he trusts it may be a source of gratification to those within the Fellowship of the Association to know that one of their number has had this distinction conferred upon him. His name is appended hereto.

CHARLES PORTER, M.D.

*London*



*Central Shrine of the Indiana World War Memorial Plaza, Indianapolis, Ind.*

## ASSOCIATION NEWS

### THE INDIANAPOLIS MEETING

WILLIAM F. KING, M.D.,

*General Chairman of the Local Committee on Arrangements*

BENJAMIN HARRISON, when President of the United States, in referring to Indianapolis, said, "I myself am a citizen of a no mean City."

Indianapolis is preparing to extend every possible courtesy to the American Public Health Association and will make every effort to have the 1933 meeting of the Association an outstanding success.

Trips will be arranged to the many places of interest in and about the City and special entertainment will be provided for women members and visitors.

For Sanitary Engineers there will be a trip to the Filtration Plant and Pumping Station of the Indianapolis Water Company and a visit to the Sewage Treatment and Disposal Plant of the Indianapolis Sanitary District. For Health Administrators a visit to the Indiana University Medical Center which includes the University School of Medicine, the University School of Dentistry, the Indianapolis City Hospital, Robert W. Long General Hospital, the Coleman Maternity Hospital and the Riley Memorial Hospital for

children. Of general interest will be visits to the International Motor Speedway; the World War Memorial; Lockerbie Street, the home of the Hoosier Poet, James Whitcomb Riley; Butler University; Garfield Park with its fountains and sunken gardens; Foster Hall, built by Mr. J. K. Lilly and dedicated to the memory of the greatest American song writer, Stephen J. Foster; the Laboratories and Biologic Farm of Eli Lilly and Company; the Scottish Rite Cathedral, said to be the finest Masonic Cathedral in the United States; the classic City Library and the newly erected State Library and historical building; the model kitchens of the Van Camp Company; the home of the Real Silk Hosiery; Indiana Soldiers

and Sailors Monument; Municipal Parks and Play Grounds and other distinctive places of interest.

For those who play golf, Indianapolis has to offer five municipal courses in addition to the splendid courses of the Country Club, Woodstock, Highland, Meridian Hills, Avalon and Arlington Clubs.

The Ladies' Auxiliary of the Marion County Medical Society is planning entertainment for women delegates and visitors to the Indianapolis Meeting. While the program of the meeting will be given first importance there will be no lack of opportunity for relaxation, recreation and special features.

Indianapolis will be at its best in October.

## ANNUAL MEETING INFORMATION

CONTINUED FROM JULY ISSUE

### Reduced Railroad Fares

**R**EDUCED railroad fares on the Identification Certificate Plan have been authorized by the several passenger associations in the United States and Canada, which will entitle all members and dependent members of their families to a special rate of fare and one-third for the round trip to Indianapolis.

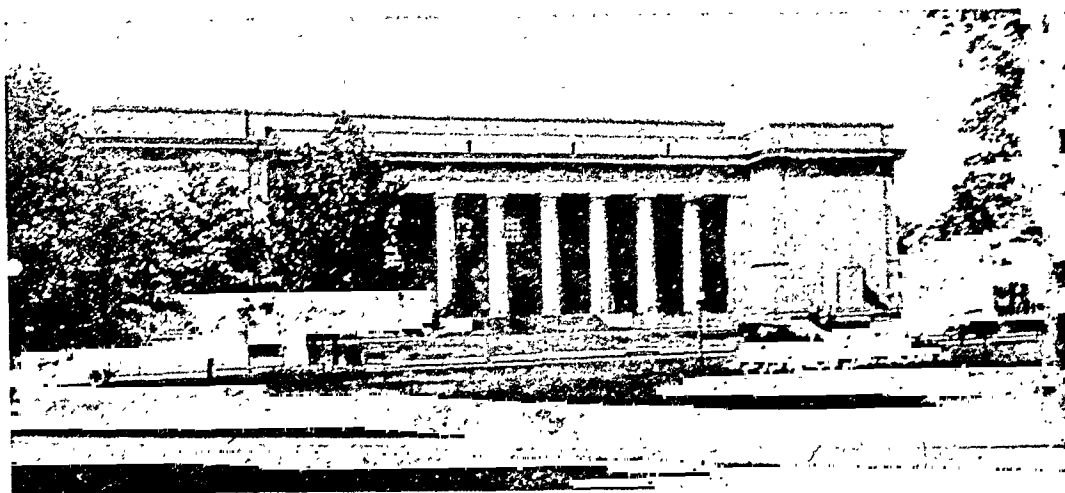
Under this plan an Identification Certificate *must be presented* to the ticket agent when purchasing tickets. (One will be mailed to every member of the Association on September 5.) This is the ticket agent's authority to issue to delegates and dependent members of their families a round-trip ticket to Indianapolis at the reduced rate. All return tickets must be validated, before leaving Indianapolis, at the regular railroad ticket office.

It is suggested that all members consult their local ticket agents in regard to dates of sale as they vary according to distance from Indianapolis. The

final return limit is 30 days in addition to date of sale. Delegates may travel to and from Indianapolis via the same route or via diverse routes, as they prefer, without additional cost.

Members who wish to include a visit to A Century of Progress in Chicago with their trip to the Annual Meeting should consult their local ticket agents as to the best route and the most favorable rates. In some cases, the World's Fair rate granted by the railroads is lower than the convention fare. Ticket agents will advise members who include the Fair in their itineraries concerning the most advantageous arrangements.

A communication to the entire membership will be mailed shortly by the New York Central Railroad giving additional information concerning travel to Indianapolis direct and via Chicago from all parts of the United States. Names of representatives in different sections will be given so that exact local details may be easily obtained.



*The Public Library, Indianapolis, Ind.*

RAILROAD RATES FROM VARIOUS CENTERS TO INDIANAPOLIS, IND.

<i>From</i>	<i>One-way</i>	<i>Fare and one-third</i>	<i>Lower</i>	<i>Upper</i>
Atlanta . . . . .	\$20.47	\$27.30	\$ 5.63	\$ 4.50
Baltimore . . . . .	24.10	32.14	7.50	6.00
Boston . . . . .	34.71	46.28	10.13	8.10
Buffalo . . . . .	16.87	22.50	5.63	4.50
Chicago . . . . .	6.62	8.83	3.75	3.00
Cincinnati . . . . .	3.95	5.27	3.00 <sup>1</sup>	2.40
Cleveland . . . . .	10.23	13.64	3.75	3.00
Dallas . . . . .	32.90	43.87	10.50	8.40
Denver . . . . .	41.67	55.56	12.00	9.60
Detroit . . . . .	9.58	12.78	3.75	3.00
Duluth . . . . .	23.03	30.71	7.50	6.00
Fort Worth . . . . .	33.34	44.46	10.88	8.70
Jacksonville . . . . .	32.69	43.59	10.13	8.10
Kansas City . . . . .	18.91	25.22	5.63	4.50
Los Angeles . . . . .	82.21	109.62	25.50	20.40
Louisville . . . . .	4.19	5.59	3.00 <sup>1</sup>	2.40
Memphis . . . . .	17.15	22.87	5.63	4.50
Milwaukee . . . . .	9.68	12.91	3.75	3.00
Minneapolis . . . . .	21.28	28.38	6.38	5.10
Nashville . . . . .	10.91	14.55	3.75 <sup>2</sup>	3.00 <sup>2</sup>
New Orleans . . . . .	31.10	41.47	9.00	7.20
New York . . . . .	29.20	38.94	9.00	7.20
Omaha . . . . .	23.97	31.96	7.50	6.00
Philadelphia . . . . .	25.96	34.62	8.25	6.60
Pittsburgh . . . . .	13.38	17.84	4.50	3.60
Portland . . . . .	83.83	111.78	25.50	20.40
Salt Lake City . . . . .	61.11	81.48	18.00	14.40
San Francisco . . . . .	82.21	109.62	25.50	20.40
Seattle . . . . .	83.83	111.78	25.50	20.40
St. Louis . . . . .	8.87	11.83	3.75 <sup>3</sup>	3.00
Montreal . . . . .	28.98	38.64	10.13	8.10
Halifax . . . . .	50.33	67.11	16.08	12.90
Ottawa . . . . .	27.78	37.04	9.38	7.50
Quebec . . . . .	34.63	46.18	12.38	9.90
Toronto . . . . .	17.48	23.31	6.00	4.80
Washington . . . . .	24.10	32.14	7.50	6.00

<sup>1</sup> Seat 75¢

<sup>2</sup> To Louisville; seat from Louisville 75¢

<sup>3</sup> Seat \$1.50

## TO THOSE WHO MOTOR

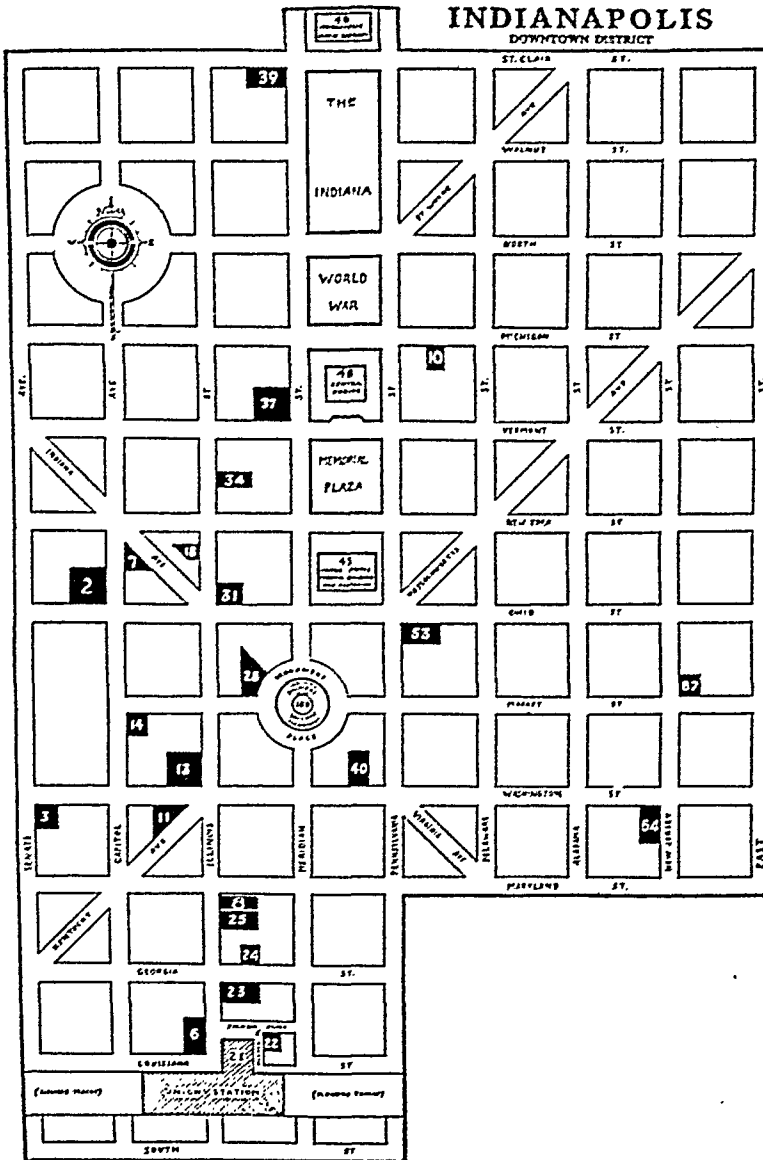
THE Conoco Travel Bureau, of Denver, Colo., offers free travel service. They will send you, on request, a set of state maps individually marked for you, to show you the best and most direct routes from your home to the convention.

The types of automobile roads and road conditions will be indicated, and lists of hotels and cottage camps will be included. Write the Conoco Travel Bureau, Denver, Colo., or fill in an application card available at any Conoco Service Station.

## RAILROAD MILEAGE FROM PRINCIPAL CITIES IN U. S. TO INDIANAPOLIS

<i>From</i>		<i>From</i>	
Austin, Texas.....	1,869.0	Louisville, Ky.....	111.7
Atlanta, Ga.....	597.7	Los Angeles, Calif.....	2,315.0
Albany, N. Y.....	761.9	Madison, Wis.....	323.3
Augusta, Me.....	1,070.8	Montpelier, Vt.....	1,047.4
Boston, Mass.....	962.3	Miami, Fla.....	1,315.9
Baltimore, Md.....	700.0	Montreal, Canada.....	899.6
Birmingham, Ala.....	615.7	Nashville, Tenn.....	409.7
Boise, Idaho.....	1,974.6	New York City.....	811.1
Cheyenne, Wyo.....	1,188.6	New Orleans, La.....	1,030.7
Chicago.....	193.6	Omaha, Nebr.....	681.5
Columbia, S. C.....	712.3	Oklahoma City, Okla.....	794.3
Charleston, W. Va.....	320.7	Providence, R. I.....	961.3
Columbus, Ohio.....	180.4	Portland, Ore.....	2,436.7
Concord, N. H.....	1,014.7	Phoenix, Ariz.....	2,131.6
Detroit, Mich.....	303.3	Pierre, S. D.....	966.1
Denver, Colo.....	1,241.6	Raleigh, N. C.....	914.8
Des Moines, Ia.....	567.9	Richmond, Va.....	580.7
Duluth, Minn.....	669.0	Reno, Nev.....	2,299.1
Fargo, N. D.....	910.9	Seattle, Wash.....	2,383.5
Helena, Mont.....	1,749.2	San Francisco, Calif.....	2,451.6
Harrisburg, Pa.....	615.9	Salt Lake City, Utah.....	1,797.1
Hartford, Conn.....	889.4	Santa Fe, New Mex.....	1,677.5
Jackson, Miss.....	695.4	St. Paul, Minn.....	604.2
Kansas City, Mo.....	534.5	St. Louis, Mo.....	252.1
Lincoln, Nebr.....	774.9	Toronto, Canada.....	566.7
Little Rock, Ark.....	601.0	Trenton, N. J.....	753.1
		Topeka, Kans.....	617.1

## MAP OF DOWNTOWN DISTRICT



- 2—Roosevelt Hotel
- 3—Williams Hotel
- 6—Spencer Hotel
- 7—Plaza Hotel
- 8—Grand Hotel
- 10—Michigan Hotel
- 11—Lincoln Hotel
- 13—Claypool Hotel
- (Headquarters Hotel)
- 14—Harrison Hotel
- 18—Colonial Hotel
- 22—Spink Hotel

- 23—Hotel Severin
- 24—Stubbins Hotel
- 25—Lockerbie Hotel
- 28—English Hotel
- 31—Brevort Hotel
- 34—Masonic Temple
- 37—Scottish Rite Cathedral
- 39—Antlers Hotel
- 40—Washington Hotel
- 53—Denison Hotel
- 64—New Eastgate Hotel
- 67—Puritan Hotel



## INDIANAPOLIS HOTEL RATES

Hotel	Room Capacity	Single Room		Double Room	
		Without Bath	With Bath	Without Bath	With Bath
Antlers Hotel . . . . .	250	....	\$2.00-\$3.50	....	\$3.50-\$6.00
Brevort Hotel . . . . .	175	\$1.00-\$1.50	1.50- 2.00	\$1.75-\$2.25	2.50- 3.50
Claypool Hotel . . . . .	600	....	3.00- 5.00	....	4.50- 8.00
Denison Hotel . . . . .	200	1.25- 1.50	1.75- 3.00	2.00- 2.50	3.00- 5.00
Graylynn Hotel (apartment hotel) . . . . .	150	....	2.00	....	3.00
Hotel Eastgate . . . . .	100	1.00- 1.25	1.50- 2.00	2.00- 2.25	2.50- 3.00
Hotel Edward . . . . .	30	1.00	1.50	1.50	2.00
Hotel English . . . . .	250	1.25	1.50- 2.50	2.00	2.50- 3.50
Hotel Harrison . . . . .	...	1.50- 2.00	2.50- 3.50	2.50- 3.00	3.50- 5.00
Hotel Lincoln . . . . .	400	....	2.50- 4.00	....	4.00- 7.00
Hotel Linden . . . . .	250	1.25- 1.50	2.00- 3.00	2.00- 2.50	3.00- 4.00
Hotel Lockerbie . . . . .	200	....	2.00- 2.50	....	3.00- 4.00
Hotel Riley . . . . .	100	1.25 and up	1.75 and up	2.25 and up	2.75 and up
Hotel Severin . . . . .	400	....	2.50- 3.50	....	4.00- 7.00
Hotel Washington . . . . .	250	1.50	2.00- 4.00	....	3.50- 5.50
Hotel Williams . . . . .	150	1.00	1.50- 2.00	1.50- 2.00	2.50- 3.00
Lorraine Hotel . . . . .	100	1.25	1.50- 2.00	2.00	2.50
The Seville (apartment hotel) . . . . .	...	....	2.50	....	2.50- 5.00
Sheffield Inn . . . . .	90	1.50	2.00	2.00	3.00
Spencer House . . . . .	125	1.25	1.50	2.00	2.50
Spink Arms Hotel . . . . .	100	....	2.50	....	4.50

.....(Cut off on this line and mail to the hotel of your choice).....

## HOTEL RESERVATION BLANK FOR INDIANAPOLIS MEETING

## AMERICAN PUBLIC HEALTH ASSOCIATION

450 SEVENTH AVENUE, NEW YORK, N. Y.

OCTOBER 9-12, 1933

To .....  
(Name of Hotel)

Please reserve for me .....rooms for.....persons  
for the A.P.H.A. Meeting.

Single room.....Double room.....

Maximum rate per day for room \$......Minimum rate per day for room \$......

I expect to arrive..... If date of arrival is changed I will notify  
you at least 24 hours in advance.

Please acknowledge this reservation.

Name .....

Street address .....

City..... State.....

## INDIANAPOLIS IS CENTRALLY LOCATED



## INDIANA AND SURROUNDING STATES

THE above map indicates the location of Indianapolis with reference to the center of population of the United States, which, according to the 1930 census, is approximately sixty miles southwest of this city.

For those attending the Annual Meeting of the American Public Health Association who are interested in seeing the

World's Fair at Chicago, it is interesting to note that there are three main paved highways from Indianapolis to Chicago, driving distance less than 200 miles. Railroad connections between Indianapolis and Chicago over the Big Four-New York Central, Pennsylvania and Monon include 17 trains daily, average running time four hours.

*The Preliminary Program of the Scientific Sessions of the Annual Meeting, and other important information, will be published in the September issue.*

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

*Health Officers Section*

- Robert M. Dodsworth, City Hall, Venice, Calif., Assistant Health Officer  
 E. A. Garrett, M.D., 804 Peoria Life Bldg., Peoria, Ill., Commissioner of Health  
 Earl E. Hansen, 369 Chorro St., San Luis Obispo, Calif., Sanitary Inspector, County Health Department  
 Oscar D. Ludwig, M.D., 5433 Madison Ave., Indianapolis, Ind., Health Commissioner, Marion County  
 Elmer T. McGaugh, M.D., Capitol Bldg., Jefferson City, Mo., Health Commissioner  
 J. Cyrille Pomerleau, M.D., Beauceville East, Beauceville County, P. Que., Canada, County Health Commissioner  
 Leslie A. White, M.D., Metlakatla, Alaska, Physician, Indian Field Service, U. S. Dept. of the Interior

*Laboratory Section*

- K. George Falk, Ph.D., 151 Central Park West, New York, N. Y., Biological Chemist, Bureau of Laboratories, Department of Health  
 Francis A. Halliday, A.B., 3505 N. Calvert St., Baltimore, Md., Student (Assoc.)  
 G. M. Pulkrabek, B.S., 608 S. Dearborn St., Chicago, Ill., Milk Sanitation and Control

*Public Health Engineering Section*

- Edmond Mallet, 2236 Cathedral Ave., N.W., Washington, D. C., Assistant Inspector of Plumbing, District of Columbia

*Child Hygiene Section*

- Bernice Wright, Box 320, Monroe, La., Executive Secretary, Ouachita Tuberculosis and Public Health Ass'n

*Public Health Education Section*

- Ina J. N. Durfee, Wolfeboro Camp, Wolfeboro, N. H. (Assoc.)

*Food and Nutrition Section*

- S. H. Crounse, 10 Vista Road, Madison, Wisc. (Assoc.)  
 Raymond Hertwig, B.S., A.M.A., 535 N. Dearborn St., Chicago, Ill., Secretary, Committee on Foods  
 Horace I. Lepman, 228 S. Wabash Ave., Chicago, Ill., Acting Superintendent, Division of Foods and Dairies, State Dept. of Agriculture

- Katherine Lloyd, B.S., Armour & Co., Union Stock Yards, Chicago, Ill., Nutritionist  
 K. M. Royer, B.S., 608 S. Dearborn St., Chicago, Ill., Milk Sanitation  
 Mervyn B. Starnes, D.V.M., Department of Public Health, Dallas, Tex., City Veterinarian

*Public Health Nursing Section*

- Alice L. Haviland, R.N., 2573 E. 55 St., Cleveland, O., Assistant Director, University Nursing District  
 Edwina Mattingly, R.N., Shepherdsville, Ky., Bullitt County Public Health Nurse  
 Virginia E. Moore, Pi Beta Phi Settlement School, Gatlingburg, Tenn., School and Public Health Nurse

*Unaffiliated*

- Joseph M. Dailey, D.M.D., 1478 Dorchester Ave., Dorchester, Mass. (Assoc.)  
 Nelson W. Strohm, M.D., 87 W. Tupper St., Buffalo, N. Y., Diagnostician, City Health Dept.  
 Burchard A. Winne, M.D., 28 N. Market St., Johnstown, N. Y. (Assoc.)

*Sustaining Member*

- The Travelers Insurance Company, Hartford, Conn.

## ADDITIONAL APPLICANTS FOR FELLOWSHIP

*Health Officers Section*

- Russell E. Hobbs, M.D., Wichita, Kans.

*Laboratory Section*

- James A. Kennedy, Ph.D., Augusta, Ga.  
 Merl P. Moon, Ph.D., Columbia, Mo.

*Public Health Engineering Section*

- Harold E. Babbitt, M.D., Urbana, Ill.  
 Alfred H. Fletcher, B.S., Memphis, Tenn.  
 Charles H. Spaulding, B.S. in C.E., Springfield, Ill.  
 Walter von D. Tiedeman, M.C.E., Elsmere, N. Y.

*Public Health Education Section*

- Walter S. Mangold, Monrovia, Calif.

*Public Health Nursing Section*

- Hettie W. Seifert, R.N., Elizabeth, N. J.  
 Ella E. McNeil, R.N., Philadelphia, Pa.

## NOMINATIONS FOR THE GOVERNING COUNCIL

IN accordance with the By-laws of the Association, the Nominating Committee reports the following nominations for the Governing Council. The Constitution provides that "upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, pro-

viding such petition is received 15 days before the Annual Meeting."

The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in Indianapolis will be elected for the three-year term, 1933-1936.

Dr. Carl Alsberg,  
Food Research Institute,  
Stanford University, California.

James N. Baker, M.D.,  
State Health Officer,  
Montgomery, Alabama.

J. Bronfenbrenner, Ph.D.,  
Department of Bacteriology,  
Washington University,  
St. Louis, Missouri.

Walter H. Brown, M.D.,  
Stanford University,  
Palo Alto, California.

John Collinson, M.D.,  
State Department of Health,  
Baltimore, Maryland.

Platt W. Covington, M.D.,  
1119 Alpine Avenue,  
Salt Lake City, Utah.

S. J. Crumbine, M.D.,  
American Child Health Association,  
450-7th Ave., New York, New York.

A. J. Douglas, M.D.,  
City Health Department,  
Winnipeg, Manitoba.

Mary J. Dunn,  
Vanderbilt University,  
School of Nursing,  
Nashville, Tennessee.

W. Thurber Fales, Sc.D.,  
Director, Bureau of Vital Statistics,  
State Board of Health,  
Montgomery, Alabama.

W. H. Frost, M.D.,  
Johns Hopkins University,  
615 N. Wolfe St.,  
Baltimore, Maryland.

Paul Hansen,  
6 N. Michigan Avenue,  
Chicago, Illinois.

I. Malinde Havey,  
National Director,  
Public Health Nursing Service,  
American Red Cross,  
Washington, D. C.

Emery R. Hayhurst, M.D.,  
1925 Concord Road,  
Columbus, Ohio.

Albert H. Jewell,  
1020 McGee Street, Room 400,  
Kansas City, Missouri.

H. E. Kleinschmidt, M.D.,  
National Tuberculosis Association,  
450-7th Ave., New York, New York.

John P. Koehler, M.D.,  
City Hall,  
Milwaukee, Wisconsin.

Sophie C. Nelson, R.N.,  
Director, Nursing Service,  
John Hancock Mutual Life Ins. Co.,  
Boston, Massachusetts.

George T. Palmer, Dr.P.H.,  
American Child Health Association,  
450-7th Ave., New York, New York.

Thomas Parran, Jr., M.D.,  
State Department of Health,  
Albany, New York.

Lowell J. Reed, Ph.D.,  
Johns Hopkins University,  
School of Hygiene and Public Health,  
Baltimore, Maryland.

Milton J. Rosenau, M.D.,  
20 Chapel Street,  
Brookline, Massachusetts.

R. R. Sayers, M.D.,  
U. S. Bureau of Mines,  
Washington, D. C.

Prof. Henry C. Sherman,  
Dept. of Chemistry,  
Columbia University,  
New York, New York.

James A. Tobey, Dr.P.H.,  
Borden Sales Company,  
350 Madison Avenue,  
New York, New York.

H. A. Whittaker,  
Division of Sanitation,  
State Board of Health,  
Minneapolis, Minnesota.

Fred O. Tonney, M.D.,  
City Hall, Room 712,  
Chicago, Illinois.

C.-E. A. Winslow, Dr.P.H.,  
Yale University,  
New Haven, Connecticut.

---

### Radio Broadcast

A new series of weekly health broadcasts, under the auspices of the American Public Health Association, began on Wednesday, June 28th, over the National Farm and Home network. The opening talk on the "Health Budget" was given by Dr. Fred O. Tonney, Head of the Research Staff of the Chicago Board of Health.

The series which is titled "A Nation's Investment in Health," will continue on Wednesdays, at about 12:35 central daylight time, during the summer, and will feature authoritative speakers from the membership of the Association on a variety of subjects.

The National Broadcasting Company and particularly its Agricultural Director, Mr. Frank E. Mullen, are to be commended for the unusual vision and public spirit manifested by them in arranging these broadcasts for the American Public Health Association.

The series is under the direction of the "President's Committee," appointed by the Executive Board for the express purpose, at the last annual

convention in Washington, D. C. The committee has "power to act in negotiating and making arrangements to broadcast programs in the name of the American Public Health Association."

The committee consists of Dr. Louis I. Dublin, New York, Chairman, past president of the Association and Vice-President of the Metropolitan Life Insurance Company, Dr. John A. Ferrell, New York, president, Dr. Haven Emerson, New York, president-elect, Dr. Kendall Emerson, New York, Acting Executive Secretary, and Dr. Fred O. Tonney, Chicago, Radio Advisor.

All statements broadcast in the name of the Association will be carefully censored by the committee and hence may be accepted as accurate and reliable within the present state of scientific knowledge. Suggestions for subjects of further broadcasts are solicited and should be addressed to the American Public Health Association, 450 Seventh Ave., New York, N. Y.

The list of speakers and topics were published in the July issue.

# PUBLIC HEALTH ADMINISTRATION

Hartford, Conn.—For economy reasons, the 1931 and 1932 records of this city of 170,120 population in 1932 are printed in one report. Ordinance requirements specify a report to the Court of Common Council in March, and such a report was made each year in manuscript form. Among the readjustments since the previous report are noted the transfer of the isolation hospital to the Board of Public Welfare where it is operated as a unit of the municipal hospital. The Board of Health laboratory is housed in this hospital, beside the hospital laboratory, and does the bacteriology and serology work for the institution. Hartford received honorable mention in the U. S. Chamber of Commerce Health Conservation Contest.

The first death from diphtheria in three years occurred in 1932. This was an adult, and the possibility of diphtheria seems to have been overlooked by the attending physician. The death rate from tuberculosis was 50.05 in 1932 as compared with 65.6 the previous year.

Edmonton, Alberta—In 1932, this city of 78,387 recorded a death rate of 7.9 as compared with 6.4 the previous year. The area of the city is 26,520 acres, including 1,000 acres of water. Hence there are some three persons per acre. The school enrollment numbered 18,353, while 2,340 births gave a rate of 19.5. An infant mortality rate of 44.2 is creditable. There were only 3 cases of diphtheria with no deaths. Diphtheria immunizations by official organizations numbered 1,514. Two well baby clinics are held each week in the city.

New Britain—The 1932 health department report indicates that in no previous year has the health record of this industrial city equalled that of the year reported. A general death rate of 7.5, an infant mortality rate of 54.3, and a tuberculosis rate of 60 are noteworthy. Whooping cough cases numbered 530 with 3 deaths, however, in contrast with 119 cases and 1 death the previous year.

Due to economic conditions, the scope of the dental clinic, originally for school children, increased to serve adults referred by the Mutual Aid Association and the Welfare Department. This clinic is located in the City Hall. The report concludes with recommendations for an isolation hospital, for municipal collection of refuse, and for the transfer of collection of garbage expenditures from the health department.

Brookline, Mass.—In 1932, Brookline, with an estimated population of 49,560, reported a birth rate of 9.04, a death rate of 11.18, and an infant mortality rate of 46.9 per 1,000 births. Diseases of the heart (146) and cancer (82) lead the list of causes of death. Seven cases of diphtheria with one death occurred during the year. Since 1922, 8,974 children have been immunized against diphtheria—672 having been protected last year.

A table showing improvement in the milk supply since 1925 is of interest. The average bacteria count per c.c. has dropped from 118,495 in 1925 to 8,944 for market milk; from 39,022 to 5,501 for Grade A; from 52,975 to 2,049 for Special milk, and from 6,860 to 1,392 for Certified milk. The per capita milk consumption is .98 pint, a figure

somewhat lower than for previous years.

A city-wide attempt was made to eradicate ragweed, the pollen of which causes "hay fever" during early fall months. Inspectors, while making a house to house search for fly and mosquito breeding places, made note of places where ragweed was found growing. Property owners were notified and coöperated in destroying the weed. A detail of welfare labor and a truck under a health department inspector was assigned to the task of aiding in the prompt destruction and removal of the weed. This work will be continued as a part of the 1933 program.

Brookline was awarded first place in the U. S. Chamber of Commerce Health Conservation Contest for cities within the 20,000 to 50,000 population group. The city health bulletin, published quarterly, is distributed by the Police Department to every house in town.

Attleboro, Mass.—Attleboro, with an estimated population of 22,187, reports a death rate of 12.8 per 1,000, with heart disease (49), and cancer (33) leading the list of causes of death for 1932. In 1931, a local survey showed 66.6 per cent of the school population and 60.8 per cent of the preschool group immune to diphtheria. In 1932, 515 children were immunized, and of these 333 were of preschool age.

The Chamber of Commerce, through its Health Committee, sponsored a campaign urging the use of more pasteurized milk. A regulation requiring pasteurization or certification of all milk sold in the city was adopted during the year, but will not be immediately enforced because of financial difficulties. All tuberculous cows are being removed from herds supplying the city with milk.

The year 1932 marks the tenth year of the Health Camp for undernourished boys, funds for the camp being furnished through the Community Chest.

As a result of the examination of a large group of undernourished children by the health department, 40 boys were enrolled in this six-week camp. The maximum gain in weight was  $23\frac{3}{4}$  lb.; the minimum  $4\frac{3}{4}$  lb. Statistical tables and reports of the various bureaus conclude this 24-page report.

Warwick, R. I.—The second annual report of Warwick, for the year 1932–1933, is well printed, but on glossy paper, with appropriate headings and sub-headings in dark print to facilitate reading. Charts, graphs and pictures aid in making this a well balanced report.

Opening with a historical sketch of the town, which was settled in 1642, the report follows the general outline of the appraisal form for rural health work of the American Public Health Association. The city scored 765 out of 1,000 possible points, as compared with 711 for the previous year. An organization chart and a detailed list of the duties of various members of the health department are of interest.

Based on an estimated population of 25,329 for 1932, the city reports a birth rate of 15.6, a death rate of 11.4 and an infant mortality rate of 73.2. With the exception of scarlet fever, pneumonia and septic sore throat, all communicable diseases in the city showed a decrease in number of cases during the year. The tuberculosis rate dropped 14 points—from 57.4 in 1931 to 43.4 in 1932.

Of the 396 births, 55 per cent occurred in homes attended by physicians; 41 per cent in hospitals, and only 4 per cent were attended by midwives. This is a well written, compact report of 33 pages.

Lorain County General Health District—According to the 1932 annual report of the Lorain County (Ohio) General Health District, the population

of the area served is 40,305. The death rate was 11.4, an increase of 1.8 over the previous year. A total of 2,131 cases of communicable diseases was reported to the health department, the largest number in the history of the department. There were 5 cases of tularemia reported as associated with unprotected handling of wild rabbits. A total of 2,032 visits was made by staff members to the cases of communicable disease, and 341 visits to suspects. During the year 1,040 vaccinations or revaccinations were given.

The Blue Ribbon Program is used in schools. There were 6,154 children enrolled in the schools in 1932. A total of 5,838 defects was found; 2,329 defects were corrected, and 1,796 children received the award of Blue Ribbons.

In 1931, the daily consumption of

milk was 1,400 gallons, with 75 per cent pasteurized. During 1932, only 1,300 gallons of milk per day were consumed and the proportion pasteurized was 71 per cent.

The laboratory made a total of 4,086 examinations, an increase being noted as largely due to communicable disease work, and the increased use of facilities by physicians of the county.

An active program in health education was carried on during the year; formal talks were given to Parent-Teacher Associations; 500 copies of the 1931 annual report were printed and distributed. More than 26,000 pieces of mimeographed material were printed and distributed. Booths were set up at both the Wellington and Elyria fairs.

The per capita cost of the health department from county and state funds was 54 cents.



# LABORATORY

## VALUE OF CULTURE TESTS IN THE DIAGNOSIS OF DIPHTHERIA\*

HAZEL M. HATFIELD, M.D., AND ALICE G. MANN

*Bureau of Laboratories, New York City Health Department*

THE question has arisen as to the advisability of continuing to use routine cultures as an aid in the diagnosis of suspected diphtheria. The fundamental diphtheria culture work of Dr. William H. Park in the early years of the problem led to the estab-

immunization on a large scale, however, the problem of diphtheria control work undoubtedly enters a new phase and the value of the routine culture examination should be re-appraised.

The very excellent studies made by Godfrey of the influence of diphtheria

TABLE I

<i>Diphtheria Morbidity</i>		<i>Diphtheria Mortality per 100,000 of Population</i>			
1925.....	9,051	1925.....	663	rate.....	10.49
1926.....	7,531	1926.....	477	rate.....	7.39
1927.....	13,507	1927.....	717	rate.....	10.90
1928.....	10,776	1928.....	642	rate.....	9.57
1929.....	8,548	1929.....	463	rate.....	6.77
1930.....	3,794	1930.....	198	rate.....	2.84
1931.....	3,999	1931.....	186	rate.....	2.62

lishment of this test as the accepted means of diagnosis and of guidance to necessary public health control measures. It is now in world-wide use and has increased in volume from year to year to an enormous extent.

The virulence test—a necessary concomitant of the microscopic test—is complicated and requires a number of days; the microscopic examination is relatively simple and quick. Except in the unusual case, therefore, the latter test stands alone as a guide to the public health authorities and to the physician.

With the introduction of diphtheria

immunizations on diphtheria mortality indicate that at least 30 per cent of young children must be immunized before a significant reduction in the diphtheria death rate is effected. Immunization work on a big scale has been carried forward in New York City since 1929 and it is estimated that 36 per cent of New York children under six years of age have now been immunized against diphtheria.

With this large and increasing immune child population one would logically expect a decrease, not only in the diphtheria morbidity and mortality, but in the amount of culture work sent into the laboratory for examination.

As a matter of fact, we find that, since the middle of 1929, the number

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

of cases reported has always been well below the expected number. The mortality figures also show a marked drop. These facts are shown more fully in Table I.

The culture work sent in for diphtheria diagnosis has shown no corresponding decrease in volume. A study of Table II shows that there was a decided drop in 1930 but the figures for 1931 and 1932 again show an up-

the days before immunization work was begun and should the physician still consider it the best practice to send in a culture from every case that even remotely might be diphtheria? May it not be true that more immune individuals harbor the diphtheria bacillus and, if so, will the organism more likely be non-virulent? If this presumption should prove to be true, a positive diphtheria report may readily

TABLE II  
DIPHTHERIA CULTURE EXAMINATIONS

	Primary		Unsatisfactory	Total	Trial	School	Laters	Total
	Positive	Negative						
1925.....	5,338	40,066	789	46,193	10,290	1,302	63,426	121,211
1926.....	3,548	36,492	827	40,867	4,056	451	72,890	118,264
1927.....	7,898	55,087	834	63,819	5,643	2,552	117,868	189,982
1928.....	6,198	49,164	4,560	59,922	4,763	1,428	131,786	197,899
1929.....	5,064	44,185	2,821	52,070	2,757	1,324	105,528	161,679
1930.....	2,093	33,096	1,212	36,401	428	261	73,943	111,033
1931.....	2,947	30,116	2,085	35,148	1,169	313	100,722	137,352
1932.....	3,272	31,273	1,936	36,481	714	1,380	129,829	168,404

ward trend. The primary cultures for 1927, 1928 and 1929 are much higher in number than those for 1930, 1931 and 1932, but the totals of all the diphtheria culture examinations for 1930, 1931 and 1932 are again approaching the totals for the peak years of 1927, 1928 and 1929. For the same years (1927 to 1931) the census shows a moderate but more or less steady decrease in the total child population under 5 years of age. (The figures for the 6-year group are not obtainable.)

In Table II it becomes apparent that the increased totals for 1931 and 1932 are due very largely to the increased numbers of later cultures. And this brings us to the question of carriers and then to a consideration of the effect of a large immune population upon the presence of virulent versus non-virulent diphtheria organisms in the throats of these carriers. Has the carrier the same significance and importance now as in

confuse the diagnosis and thus deprive the patient of proper medication—substituting for it a dose of antitoxin which the patient may not need and, if the patient survives, putting on record another carrier whose particular strain of diphtheria organism eventually proves to be non-virulent.

Having in mind the above considerations, an attempt has been made to determine the type of case giving a positive primary culture compared with the type of case giving a negative primary culture. Data have also been obtained regarding previous immunization of the positive cases. Lastly, a study has been made of the virulence of the diphtheria strains so isolated.

Positive primary cultures were selected at random, the physician contacted in each case for pertinent data and the culture subjected to virulence test. These findings have been summarized in Table III.

TABLE III  
POSITIVE DIPHTHERIA CULTURES IN RELATION TO TYPE  
OF CASE AND VIRULENCE DETERMINATION

Type of case	No. of cases	Under 6 yrs.	6-16 yrs.	Adult	Exposure		Immunization				Virulence	
					Yes	?	Yes	Partial	No	?	Pos.	Neg.
Clinically diphtheria	18*	7	8	3	4	14	4	0	13	1	6	12
Clinically not diphtheria	12	8	2	2	0	12	2	3	†6	1	4	8
Routine (camp, institution, hospitals)	9	5	4	0	0	9	‡5	1	3	0	0	9
Trials (contacts)	4	3	1	0	4	0	0	0	3	1	1	3

\* One case (of membranous croup) died. All the other cases recovered.

† One of these cases had received a first dose of T.A.T. six days before illness began.

‡ Of these five children, one had had diphtheria and four had had T.A.T. One had given a negative Schick.

In comparison with the positive cases tabulated above, the clinical diagnosis in 19 cases having a negative culture are stated as follows:

- 1 diphtheria
- 6 tonsillitis
- 2 spasmodic croup
- 1 croup
- 1 Vincent's infection of the mouth
- 1 acute pharyngitis
- 1 septic sore throat
- 4 rhinitis (one purulent)
- 1 acute laryngitis with stridor
- 1 post-tonsillectomy condition

The positive cultures classified as virulent or non-virulent in Table III have been further correlated with the history of immunization in each case with the results shown in Table IV.

In conjunction with the virulence table, a number of cases are cited because of their unusual features:

1. A child of 21 months was admitted to the hospital on the third day of illness with a diagnosis of membranous croup. There was a so-called typical laryngeal membrane. Fifteen thousand units of antitoxin was given

intramuscularly and 10,000 units intravenously on admission. Four cultures taken on admission—2 from the throat, 1 from the nose and 1 from the pharynx—all showed a morphologically

TABLE IV  
VIRULENCE FINDINGS IN RELATION  
TO IMMUNIZATION

Type of Case	Virulent		Immunization			
	Yes	No	Yes	Partial	No	?
Clinically diphtheria	6	—	1	0	4	1
	—	12	2	0	10	0
Clinically not diphtheria	4	—	1 slight	1	2	0
	—	8	1	2	4	1
Routine camp institution hospital	0	—	0	0	0	0
	—	9	5	1	3	0
Trials (contacts)	1	—	0	0	1	0
	—	3	0	0	2	1

typical diphtheria bacillus. The child died 2 days later. On virulence test, however, all 4 cultures proved to be non-virulent in guinea-pigs of proved susceptibility.

2. In a boarding-home for poor children, a 2-year old child became ill with very moderate symptoms, fever and a suggestion of a membrane, slightly indicative of diphtheria. The child had never been immunized and was ill only a day and a half. A throat culture was positive and the culture was virulent. *But*, of the 5 other children in the home and in contact with the patient, none of whom had been immunized, one other child was ill with a typical follicular tonsillitis and had a negative throat culture, and two had positive throat cultures which were non-virulent. The child with tonsillitis gave a very strong Schick reaction. Incidentally, the two positive contacts continued to be positive and were released from quarantine as carriers only after their inclusion in this special study had proved them to be non-virulent.

3. A culture from a child with a temperature of 104 and large, congested tonsils was found morphologically posi-

tive for diphtheria. The patient was recovered in 24 hours. This child had a history of repeated sore throats and plans were under way to have a tonsillectomy performed. There was no membrane. Six days prior to onset of illness the child had received his first dose of T.A.T. at the Health Department. The physician felt very sure that this was not a diphtheritic infection and was extremely annoyed at the routine quarantine restrictions. This culture proved to be non-virulent.

4. A patient with a typical case of diphtheria, a positive throat culture and with a residual paralysis of the soft palate and nasal voice was found to be the carrier of a non-virulent strain.

5. A child of 4 years, after a month of hospitalization for treatment for hematuria, developed a running nose and "cold." A routine culture was morphologically positive for diphtheria but was non-virulent on further test.

A summary of the virulence work performed in the Health Department Laboratory, exclusive of those tested in the Willard Parker Hospital, shows the following:

TABLE V  
SUMMARY OF ROUTINE VIRULENCE FINDINGS

Year	Virulent	Non-virulent	Total	Child Population Under 5 Years
1927 .....	48	44	92	553,000
1928 .....	31	50	81	551,000
1929 .....	11	86	97	548,000
1930 .....	8	63	71	536,000
1931 .....	7	129	136	531,000
1932 (9 months)....	8	147	155	Figures not obtainable

The facts here adduced tend to show that there has been a shift in the diphtheria situation. This is borne out by the laboratory data. There has not been a reduction in the laboratory tests sent in at all commensurate with the immunity work accomplished. The question arises as to how far the phy-

sicians are justified in sending cultures for diphtheria examination and at what point the natural barriers of more or less universal immunizations will obviate the demand for laboratory tests on this big scale. At what point will the great expense of this work no longer be justified? And, much more

important, will it be true that, if the number of carriers of non-virulent diphtheria bacilli increases markedly as the immunity work progresses—a situation at least suggested by the above facts—will it not be true that a positive laboratory report will confuse the diagnosis and cause to be treated as diphtheria many cases of streptococcal, influenzal and other type infections? Under these new conditions a positive

culture would become merely a presumptive indication that the case was one of diphtheria and should not of itself cause quarantine unless the case clinically would justify such a diagnosis.

When will the carrier cease to be more than a remotely potential menace and when may the laboratory expect to rid itself of an amount of microscopic examinations which gives no indication of dropping away spontaneously?

---

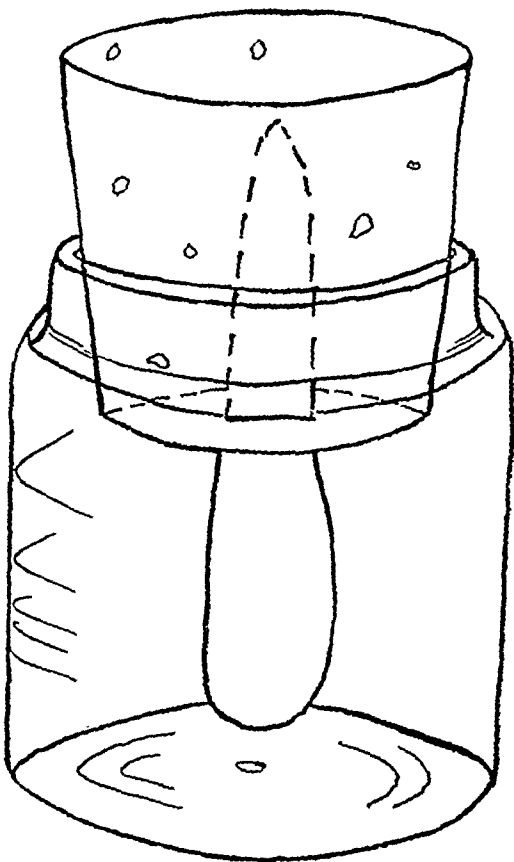
## A CONVENIENT FECES SPECIMEN CONTAINER

M. FROBISHER, JR.

*The Eastern Health District Laboratory, The Johns Hopkins University,  
School of Hygiene and Public Health, Baltimore, Md.*

IN obtaining specimens of feces for bacteriological examination it is often the practice to leave with the patient a small bottle or other container with the request that the specimen be put therein. The patient is many times left to devise a means of actually transferring a suitable portion of the fecal deposit into the container and the results are frequently unsatisfactory. Either the patient is not sufficiently ingenious to meet the situation and solves the problem by presenting a tomato can with an entire stool or else loses interest and fails to save a specimen. The use of a teaspoon or kitchen knife is inadvisable on sanitary grounds, for esthetic reasons and because of the possibility of introducing pathogens into the specimen from an outside source—possibly from some other carrier in the family.

A sterile wooden spatula is sometimes sent with the specimen container. This is frequently mislaid, suitable dis-



posal may be difficult and contamination or infection from the spatula during handling may occur.

An outfit was devised to avoid these disadvantages and is now in use in this laboratory. It consists simply of a 2 ounce, wide-mouth glass bottle with a cork stopper. A wooden tongue blade is cut into halves and one end of each piece is whittled to a sharp, flat point which is thrust firmly into a cut in the narrow end of the cork, the cut in the cork having previously been made with a paring knife. The cork is then fitted into the bottle and the whole sterilized in the hot air oven at 170 C. for 2 hours.

A good grade of cork or a rubber stopper must be used in order to avoid leakage if pressure develops. If a preserving solution is used, sterilization may be accomplished in steam.

A slightly more expensive modification of this outfit may be made from

sheet metal. The wooden paddle is replaced by a piece of metal, and this may be fastened with a few drops of solder (necessitating steam sterilization) to the inside of a metal clamp—or screw-cover, very much in the same manner as small brushes are supplied in cans of certain brands of automobile "touch-up" paint. The possibility of bactericidal or bacteriostatic effects due to the metal must be taken into consideration before adopting such a device. Much will depend on the distance, time and temperatures involved in transporting the material to the laboratory. Both types of paddle can be used more than once. Metal paddles can be made spoon-shaped to facilitate the collection of liquid material.

In collecting the feces specimen the spatula always remains with the bottle, it is not touched by anyone and no disposal or esthetic problem arises.

# VITAL STATISTICS

**Diphtheria Mortality in Large Cities of the United States in 1932**—Reports from 93 cities in the United States, showing the number of diphtheria deaths recorded in 1932, presents a pretty good index of the diphtheria situation during the last year.

Among the ten cities with the lowest diphtheria death rates were five (Albany, Grand Rapids, South Bend, Utica, and Yonkers) which escaped recording a single death rate from diphtheria in 1932. The five cities with the next lowest rates were St. Paul (0.3), Seattle (0.3), Newark (0.4), Syracuse (0.5), and New Haven (0.6).

The ten cities with the highest diphtheria mortality were Dallas (16.3), Knoxville (15.2), Peoria (12.6), Fort Worth (11.7), Lowell (11.0), Wichita (9.2); Camden (8.4), Des Moines (8.2), Oklahoma City (8.2), and Memphis (7.6).

Geographical arrangement of the cities finds those in the Middle Atlantic states with an aggregate diphtheria mortality of 2.5 per 100,000 in 1932, thereby improving their excellent record of 2.8 in 1931 and easily maintaining their ranking as the group having the lowest diphtheria mortality. Three of the five American cities that did not register a single death from diphtheria in 1932 are in this geographic division. It is suggestive of the fact that several cities in this group were among the first in the country to put into practical application modern methods of diphtheria control. New York, for the third consecutive year, reported a very low rate—one of 2.9, this being slightly higher than the 1931 figure of 2.6 but identical with the 1930 rate of 2.9. Special attention may be directed to the low rate for

1932 in Philadelphia (0.8), the best record yet achieved by any American city with a population of more than a million. The City of Camden, for the second year in succession, registered the highest diphtheria mortality rate of the cities in this group with a figure of 8.4 per 100,000.

The New England group again made a new low record (3.65). The Connecticut municipalities, led by New Haven, have had a notably smaller diphtheria mortality than the Massachusetts cities in recent years. Bridgeport, after several years of an intensive control campaign, made a particularly fine showing in 1932, the single diphtheria death reported being that of a nonresident. The diphtheria mortality rate of 4.2 in Boston was lower than for the year before (4.7) although not quite equalling its banner year 1930 when a rate of 2.9 was recorded. Lowell, however, experienced a considerable increase in diphtheria in 1932, showing a death rate of 11.0 in contrast to the figure of 5.0 in 1931. Worcester, after experiencing diphtheria mortality of 1.5 per 100,000 population in 1930 and 4.0 in 1931, recorded a rate of 6.0 in 1932.

Several of the cities in the South Atlantic states showed notable improvement over preceding years. Among these were Richmond, which recorded the low diphtheria death rate of 1.1 in 1932 in contrast to 5.4 in the preceding year; Baltimore with rates of 1.8 and 2.8 in 1932 and 1931 respectively; and Wilmington with 1.9 and 6.6 for the same two years. The three Florida cities, Tampa (4.6), Jacksonville (7.1), and Miami (7.3) on the other hand, reported rates that indicate an excessive prevalence of diphtheria. It might also be noted that

Miami in 1932 recorded more than double the diphtheria rate in New York.

The East North Central group of cities which in 1925-1929 had the highest average diphtheria mortality of any section of the country, has made the greatest relative improvement and now with a combined death rate of 2.7, its diphtheria record ranks second only to the Middle Atlantic Cities, which had a rate of 2.5 in 1932. A notable decrease in diphtheria fatalities was shown by Cleveland which had a diphtheria death rate of 1.4 in 1932, 1.2 in 1931, and 4.1 in 1930, after having experienced a rate of 15.3 for the five-year period 1925-1929. Detroit and Chicago also have recorded spectacular reductions in diphtheria mortality in recent years; Chicago, especially, has made remarkable strides in bettering its record, dropping to a diphtheria death rate of 1.9 in 1932 as compared with 6.2 in 1931 and 12.2 in 1930. Dayton and Fort Wayne with diphtheria death rates of 7.7 and 5.8, respectively, seem to have had an unusual prevalence of the disease; Peoria, with a death rate of 12.6, apparently had a real epidemic.

The East South Central cities, as a whole, did not show much change from the high rates of the preceding year. The cities, as a group, had a diphtheria mortality of 6.1 in 1932 as compared with 6.9 in 1931 and 5.0 in 1930.

Six of the eight West South Central cities showed an increase in 1932 over 1931, and the group as a whole had an average rate of 8.2 in 1932, as against 5.9 in 1931. Fort Worth and Dallas, with diphtheria death rates of 11.7 and 16.3, respectively, seem to have been the chief sufferers from this disease. It is curious that diphtheria should now be so relatively prevalent in this region, since from 1900 to 1920 the cities of the Southwest had considerably less diphtheria mortality than the rest of the country.

The group of cities in the Mountain and Pacific States showed an increase in the diphtheria rate from 2.7 for 1931 to 3.4 for 1932; Tacoma, the only city in this group to record a reduction, registered rates of 0.9 in 1932 and 8.3 in 1931. Seattle, with a rate of 0.3, and Salt Lake City with a rate of 0.7, had the best records of this group in 1932.—*J.A.M.A.* 100:1595-1597 (May 20), 1933.

**Provisional Figures for Live Births, Infant Mortality, and Stillbirths in the Birth Registration Area (Exclusive of Massachusetts and Utah) in Continental United States, 1932**—The Bureau of the Census announced that in the birth registration area of continental United States (exclusive of Massachusetts and Utah) during the calendar year 1932 there were 1,961,618 births, 113,661 deaths of infants under one year of age, and 75,175 stillbirths. These figures are equivalent to a birth rate of 17.3 per 1,000 population, an infant mortality rate of 57.9 per 1,000 live births, and a stillbirth rate of 3.8 per 100 live births. The corresponding final rates for 1931 for the same area were 18.0, 61.9, and 3.8, respectively.

The birth rate of 17.3 for the 44 states and the District of Columbia covered by this press release is the lowest since the establishment of the Federal birth registration area in 1915. The infant mortality rate (57.9) is also lower than for any previous year. The stillbirth rate (3.8) is the same as for 1931 and has varied but very little since 1922, in which year the annual collection of stillbirth records was begun.

The urban part of the birth registration area of 1932, except Massachusetts and Utah, includes 864 cities, towns, and townships, with an estimated total population of 54,979,000 on July 1, 1932. In this urban area there were 896,334 births, 51,136 deaths of



infants under one year of age, and 35,317 stillbirths. The rural part had an estimated population of 58,367,000, among which there were 1,065,284 births, 62,525 infant deaths, and 39,858 stillbirths. In the urban portion of the area the birth rate was 16.3 per 1,000 population, the infant mortality rate 57.1 per 1,000 live births, and the stillbirth rate 3.9 per 100 live births. The corresponding rates for the rural portion of the area were 18.3, 58.7 and 3.7 respectively.

Naturally, the greatest number of births occurred in the most populous states—New York, having 198,353, Pennsylvania, 168,533, Illinois, 111,512, and Ohio, 101,043. The highest birth rates, however, were for New Mexico, 28.0, North and South Carolina, each 23.7, and Alabama, 23.5. Nevada,

Wyoming, and Delaware had the smallest number of births, 1,244, 4,231, and 4,264, respectively, but the states having the lowest birth rates were California and Oregon, each with 13.1, Nevada and Washington, each with 13.4, and Illinois, with a rate of 14.4.

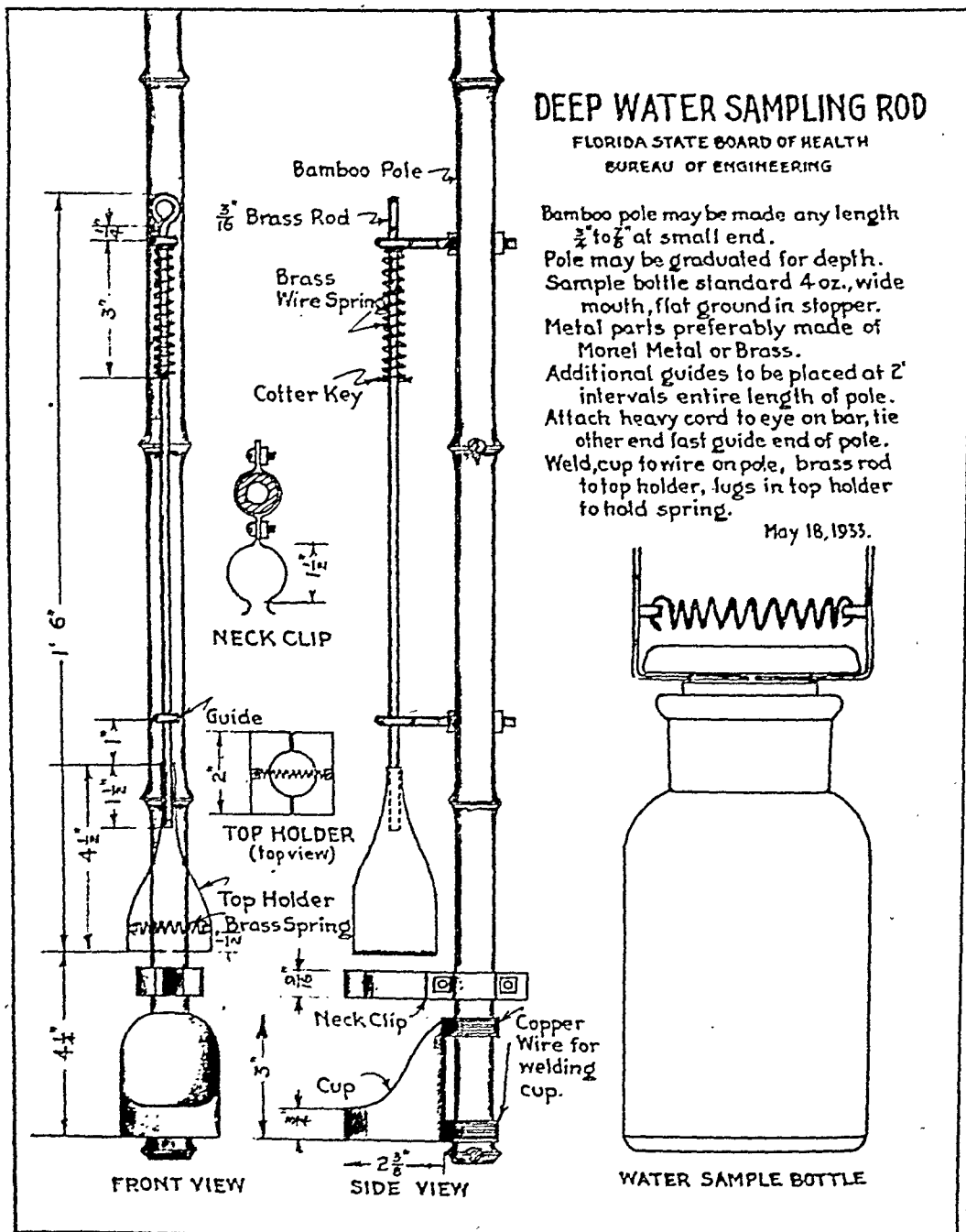
The greatest number of deaths of infants under one year of age occurred in New York (10,446), Pennsylvania (10,107), and Ohio (5,961). The highest infant mortality rate was for New Mexico (113.6), which was the only state with a rate higher than 100.0 per 1,000 live births. Other states with high infant mortality rates were Arizona (94.5), Colorado (73.2), District of Columbia (72.9), South Carolina (76.6), and West Virginia (75.3). —U. S. Department of Commerce, Bureau of the Census. *Press Release.*

# PUBLIC HEALTH ENGINEERING

## A DEEP WATER SAMPLING ROD

LOUVA G. LENERT

*Chief Engineer, Bureau of Engineering, Florida State Board of Health,  
Jacksonville, Fla.*



THE first requisite of shellfish sanitation is that the growing areas from which they are taken must be approved by the state agency having jurisdiction over same. To determine the fitness of these areas for shellfish production requires extensive physical surveys of the shore line and contributing drainage area. When this survey indicates considerable pollution of the water a bacteriological survey of the waters over the producing areas becomes necessary. Samples of water are taken under different wind and tidal variations to determine their effect upon the distribution of pollution. Surface samples in some cases may give a fair index of actual conditions, but bottom samples are more indicative of the condition of the growing area itself.

The deep water sampling rod illustrated was first developed by C. D. Hopkins, M.D., for taking samples of water from Hillsborough Bay below the City of Tampa, Fla., at depths varying from two to twelve feet. Very rapid progress can be made with this device which is operated as follows:

All sampling is done over the side of

a boat. Upon nearing the point where a sample is desired the sterile cover is removed from the top of the water sample bottle, which is then inserted in the cup at the bottom of the rod, being held firmly in place by the neck-clip. The top holder is expanded and allowed to slip into the groove of the ground glass stopper as is shown in the large scale illustration. The lugs and spring which serve to keep the top holder closed also prevent the stopper from slipping out. The stopper is then given a half turn to be certain it is not stuck tight, being careful not to permit the fingers to touch the top of the bottle.

As the boat arrives at the appointed spot, the operator plunges the rod forward in the direction of travel and down to the depth desired. When the rod reaches the vertical position the cord attached to the eye of the top holding bar is pulled momentarily to permit filling of the bottle and is then released. The rod is then brought into the boat and the bottle is removed to the carrying case and a new bottle is inserted for the next sample.

# CHILD HYGIENE

## REPORT OF THE PRESCHOOL CENTER PROGRAM OF THE CLEVELAND CHILD HEALTH ASSOCIATION

E. V. THIEHOFF, M.A., M.D.

*Acting Director, Cleveland Child Health Association, Cleveland, Ohio*

REALIZING that the health and welfare of the infants in Cleveland are well provided for in the infant welfare stations of the Cleveland Division of Health and that the school children are given health supervision in the public and parochial schools, but that little attention is being given to the preschool child, the Cleveland Child Health Association decided to set up a program of preschool centers as a step toward meeting the existing needs for this age group. In the summer of 1932 six centers were established in various community centers on a volunteer basis. The success of these centers was so pronounced that in the fall of 1932 it was decided to establish some of them on a permanent basis.

The first problem to be considered was space and maintenance. The room space, light and heat, and janitor service are now provided free of charge by such agencies as the Division of Health, community social settlements, Associated Charities, and church organizations.

The matter of equipment was considered next. The Mayor's Committee on Recreation gave the centers a quantity of used toys, including a slide and sandbox, at the time the centers were opened in the summer. A public school sent a supply of toys to one of the centers. A storage warehouse company gave a piano to one of the centers. The Division of Health loaned a scale for the weighing of the children.

Financial aid and food contributions also have been received.

Service contributions are secured from volunteer workers, including nursery school instructors, nutritionists, doctors, dentists, and nurses. Carfare expenses of volunteers are met by the Association and the doctors, dentists, and some of the nurses receive a small honorarium for their services. The trained preschool instructors, one in charge of each center, are the only workers on a salary basis.

The preschool centers which are functioning now may be divided into three groups:

*Group I.* A center established some years ago at a Health District Station, which gives medical supervision, including examination, vaccination, immunization, and close follow-up work in the homes by nurses.

*Group II.* Four centers established by the Cleveland Child Health Association which offer a health and play program, including recreation, habit training, nutrition, medical and dental examinations, and follow-up work.

*Group III.* Three centers established by interested groups with whom the Cleveland Child Health Association cooperates in securing medical and dental examinations and in supplementing their nutrition program.

In Group II the children follow regular daily routines of free play, supervised play, toilet routine, mid-session lunch, and rest period. The supervised play includes rhythms, songs, games, story hour, rhymes, and simple handicraft. The centers are open for two and one-half hours daily, either morning or afternoon.

## RECREATION AND HABIT TRAINING

The preschool instructor is interested not only in the physical aspects of the child, but in the mental and emotional as well. It is her purpose to try to give the child as ideal an atmosphere in which to develop as possible. She sets up daily routines for the children which are simple. For example, there is the daily toilet routine, during which the child learns to use the paper, flush the toilet, and wash and dry his hands. He does not always want to wash his hands; but he soon learns this must be done. After a short time he grows to like routines as they give him a sense of security. In fact certain procedures become so fixed that it is almost impossible to change them.

The children learn that when they play hard, they are too tired to enjoy a luncheon and so must rest before eating. The period may be from fifteen minutes to half an hour, depending on how hard they have been playing. During the rest period the worker can observe many difficulties such as thumb sucking, which can be overcome during the rest period by asking the child to put his hands behind his head.

When difficulties arise, the teacher tries to help the child meet and solve his own problems, rather than to solve them for him. She tries to answer all his questions satisfactorily and intelligently. In speaking she is careful not to use words which are above the child. The children are told the toys are in the center for everyone and must be shared; but when one child has a toy it is his until he drops it for another. They are allowed to make their own group rules. The worker tries to get the child to form his own opinions. If he does not agree with her, where possible, she lets him proceed and learn the result of his opinion.

Many of the children in the centers come from desolate homes. A pretty, neat room is essential to them, as it

gives a new outlook and instills in them the desire for the beautiful. The children in these centers learn the nursery rhymes and hear the stories and songs which are the right of all children but which are often denied to children of this economic group. They are given opportunities to express themselves through music and rhymes.

## NUTRITION

Cod liver oil is given daily to the children during the winter months. The mid-session lunch has included milk, tomato juice, cream soups, cereals, crackers, whole wheat bread, and bananas and milk.

In connection with the lunches the teacher has the opportunity to teach table manners, politeness, etc. She does this not so much by telling the children what is proper as by doing the proper thing herself and allowing them to imitate her. During the lunches it is possible also to teach the children the value of certain foods and to interest the children in them.

A nutritionist weighs the children weekly and keeps individual graphs to show gain or loss in weight. She discusses food habits and menus with the mothers.

## HEALTH SUPERVISION

Daily inspection is carried out to detect symptoms of illness, and all suspects are excluded. Attention is given to personal cleanliness, and instruction in health habits are inculcated in the daily program.

A quantity of tooth brushes were secured for the centers. A routine of brushing the teeth is carried on.

At stated intervals of about six months the children are given complete physical examinations, and yearly dental examinations. A public health nurse assists in these examinations and makes follow-up calls in the homes, referring cases for correction to private doctors

and dentists or to the proper dispensaries and clinics.

#### COST OF CENTERS

The average monthly expenditures are \$70 per center. On the basis of an average attendance of 20 children a day at a center, the cost per child is

\$3.50 a month or sixteen cents a day.

Social rating reports are secured for each child from the Social Service Clearing House of Cleveland. As the centers are free to the children attending, each child accepted is one who is or has recently been active at one of the recognized social service agencies.

---

## REPORT OF AN EXPERIMENT DETERMINING THE EFFECT OF WEATHER ON CHILDREN'S SLEEP

THIS experiment was conducted by Eunice Pierce, who is one of the trained instructors at a preschool center of the Cleveland Child Health Association.

It was conducted in four nursery schools located in Cleveland—Western Reserve, Hanna, Mather, and Wade—and extended over a period of six months, in order to determine the effect of weather on the sleep of children.

The time the children went to sleep was tabulated and again the time they woke up, thus giving the actual length of the naps. The weather, temperature, and rain charts issued monthly by the government were used and correlated with the length of the sleep periods. Sixty-four children, thirty-two boys and thirty-two girls, were observed in the course of the experiment.

The results pointed to the following conclusions:

1. That the length of time children sleep is variable.

2. That weather affects the length of time children sleep.

3. That children sleep noticeably longer on rainy days.

4. That nap lengths drop tremendously on the first day of severe weather change, either hot or cold.

5. That the sleep tends to go back toward the normal if the extreme cold or hot level lasts for more than one day.

6. That boys as an average tend to sleep longer than girls.

7. That sleep falls off markedly preceding an illness.

8. That the 2 and 3-year olds do not sleep longer than the 4 and 5-year olds as an average.

9. That the sleep graphs of the children from different sections of the city followed much the same curves.

# INDUSTRIAL HYGIENE

**Psychrometer Has Two Wet Bulbs**—Precise measurement of humidity from zero to nearly saturation, and at air temperatures up to 150° F., is possible with an improved psychrometer developed at the Bureau of Standards. Two wet bulbs are used in this instrument.

The wick which supplies water to the wet bulb passes through a perforated tube which serves as a first wet bulb of the instrument. The second wet bulb is of the ordinary type. By this means the water supply for the second wet bulb is pre-cooled to the evaporation temperature.

Tests covering the range of temperature from zero to 150° F. show that the precision of humidity measurement depends only on the precision of the thermometers used.—*Heating, Piping & Air Conditioning*, V, 4:206 (Apr.), 1933.

L. G.

**The Presence of Lead Dust and Fumes in the Air of Streets, Automobile Repair Shops, and Industrial Establishments of Large Cities**—A survey to determine the amount of lead dust and fumes present in the air of city streets, automobile repair shops, and non-lead-using industrial establishments was made in 14 of the largest cities in the United States. The Greenburg-Smith Impinger apparatus was used as the air sampling instrument. An average volume of about 8 cubic meters of air at the breathing level was taken in each sample.

In all, 78 samples were analyzed; 25 in automobile repair shops, 28 in streets, and the remaining 25 in various types of industrial plants in which lead compounds were not handled. The air of automobile repair shops disclosed an

average of 0.13 mg. of lead per 10 cubic meters with a maximum of 1.11 mg. The average for the street samples was 0.09 with a maximum of 0.34, and the non-lead-using industries averaged 0.10 with a maximum of 0.35. Eighty-six per cent of all the samples in the three sampling places contained less than 0.2 mg. of lead in 10 cubic meters of air.—J. J. Bloomfield and H. S. Isbel, *J. Indust. Hyg.*, XV, 3:144-149 (Mar.), 1933.

L. G.

**Safety Regulations for Refrigeration Equipment**—The following safety regulations have been recommended by the authors in order to minimize hazards from automatic refrigeration equipment:

(1) The quantity of refrigerant in any one apparatus or system shall not exceed 20 lb.

(2) There shall be at all critical points pipes leading to the outside air and provided with fusible plugs which will open at temperatures in excess of 160° F., and thus permit the escape of the entire charge of refrigerant.—Yandell Henderson and Walter V. Babson, *J. Indust. Hyg.*, XV, 3:154-155 (Mar.), 1933.

L. G.

**Noise in Heating and Air Conditioning: Where It Occurs and How It Is Prevented**—In the practice of air conditioning and ventilation the engineer is often faced with the problem of designing and constructing a system practically free of noise. Such installations require care in the design of the individual parts of the installation. In some cases it is necessary to use special treatment in the construction of machinery foundations and it

may become desirable to treat the machinery room itself with noise absorbent material. The prevention of noise in the ducts may often be accomplished by proper fan selection, correct duct design, paying particular attention to air velocities obtained, and to the use of non-noise and vibration conducting connections at certain vital places in the system. Air baffles properly placed have considerable value in this connection.

This paper describes the use of one of the new noise measuring devices for the estimation of the noise produced at the air filters in a radio studio ventilation system when various arrangements of air filters were utilized. The paper does not provide a basis for broad conclusions in noise prevention but points out this valuable use of noise measuring device in the ventilating art.—Samuel R. Lewis, *Heating, Piping and Air Conditioning*, V, 4:198-199 (Apr.), 1933.

L. G.

**The Effect of Viosterol on the Excretion of Lead**—It is known that small doses of viosterol favor calcium deposition while larger doses of this substance favor calcium excretion. Since the metabolism of lead and of calcium are affected by the same influences, experiments designed to determine the effect of large doses of viosterol on lead excretion in cats were carried out.

In the first experiment six cats were each given 100 mg. of lead in the form of the acetate in 25 c.c. of milk daily for 49 days. The lead dosage was then discontinued for 21 days to permit deposition of lead in the bones. At the end of this period 3 cats were given 20 drops of viosterol daily in 25 c.c. of milk, while three others were used as controls. The viosterol cats were found to excrete about 10 times more lead than those of the control group.

In the second experiment six cats

were given 100 mg. of lead daily in the form of carbonate which was sprinkled on the food. This was continued for 21 days when two of the animals had convulsions and died. Lead administration to the remaining cats was discontinued for 10 days. At the end of this period feces were collected and analyzed for lead in 3-day periods. This 3-day sample was used as a control for lead excretion. Twenty drops of viosterol were then added to the diet in a small amount of milk at the end of the first 3-day period. The average daily excretion of lead per cat rose sharply after viosterol was begun and reached a peak in the fourth period when the amount of lead excreted per cat was 37 times greater than it had been in the control period.

The investigations suggest that viosterol may prove an acceptable form of therapy in cases of lead poisoning after exposure to lead has ceased.—Frederick B. Flinn and Adelaide Ross Smith, *J. Indust. Hyg.*, XV, 3:156-159 (May), 1933.

L. G.

**Sulfur Dioxide in Pittsburgh Air**—Sulfur dioxide determinations were made in the city of Pittsburgh as a part of the Mellon Institute's air pollution investigations. The results of the survey showed that the amount of sulfur dioxide present in Pittsburgh air is too small to cause concern from a hygienic standpoint. The average concentration of sulfur dioxide in 1932 was 0.14 parts per million.

It was found that the concentration of sulfur dioxide varied with the amount of fog in the atmosphere. On all days when the fog cleared by afternoon there was a corresponding sulfur dioxide decrease. On a day when the fog did not clear, the sulfur dioxide concentration was found to rise.—Carlisle Schade, *J. Indust. Hyg.*, XV, 3:150-153 (May), 1933.

L. G.



**The Roentgenological Aspects of Pneumoconiosis and Its Medico-Legal Aspects**—In this article the authors question the wisdom of designating the appearance of pneumoconiosis by any term denoting numerical stages of progress and suggest the designation of the appearance by terms which imply their pathological nature. The following classification of silicotic appearances based upon known pathological changes has been suggested in place of the old numerical stages:

1. Peribronchial-perivascular-lymph node predominance. This may be rapid or slow, usually the latter.
2. Early interstitial predominance. This may be extremely or moderately rapid, depending upon the silica intake. It may or may not have an associated slight nodular appearance.
3. Advanced interstitial predominance.
4. Nodular predominance. Rapidly or slowly progressing.
5. Advanced diffuse or terminal fibrosis.
  - Conglomerate nodular type.
  - Interstitial type.
  - Massive fibrotic type.

The importance of roentgenology as a means of attack and defense in medico-legal questions in silicosis compensation cases is brought out. The creation of a competent Medical Board in each state is recommended in order to act on all claims for disability from pneumoconiosis. It would then be desirable to have each state pass compensation laws as nearly uniform in essential details as possible.—Henry K. Pancoast and Eugene P. Pendergrass, *J. Indust. Hyg.*, XV, 3:117-135 (May), 1933. L. G.

**Toxicity of Osmium Tetroxide (Osmic Acid)**—Metallic osmium is an entirely innocuous substance but when heated in air or oxygen, or acted upon by oxidizing agents, osmium tetroxide is readily formed. This highly volatile osmium tetroxide has been the

cause of numerous cases of severe poisoning.

Experimental work with white rabbits showed osmium tetroxide to be definitely toxic in concentrations of 250 mg., 500 mg., and 1 gm. in 190 liters of air. The time of exposure was 30 minutes. All of the animals succumbed. Those receiving 250 mg. survived for 4 days on an average, while the average survival time of those exposed to 1 gm. was but 30 hours.

The objective symptoms produced are the result of the action of irritant vapor on the exposed mucous surfaces and skin, upon the respiratory tract, and indirectly also on the kidneys. Autopsies showed the entire lung to be dark red with scattered irregular areas of purple. Dark discolorations were found on the epithelial lining of the bronchi and bronchioles. This staining was more marked in the trachea, the epiglottis, and the interior of the larynx, all of which were jet black.

The effect of osmium on the eyeball was also studied.

Protection from osmium tetroxide may be afforded by a reliable draft, preferably through a spray of 10 per cent sodium hydroxide to absorb the oxide. Where minute quantities are encountered, protection of the eyes by air-tight goggles is sufficient. In higher concentrations a mask with an "all service" canister affords an adequate safeguard.—F. R. Brunot, *J. Indust. Hyg.*, XV, 3:136-143 (May), 1933. L. G.

**Obtaining Comfort Conditions by Controlled Radiation from Electrically Heated Walls**—This investigation showed that by heating large surfaces such as the walls, ceiling or floor of a room to low temperatures (80-120° F.) comfort conditions may be maintained with relatively low air temperature (60° F.), thus resulting in a saving of heat. The power consump-

tion for the heating panels varied from 5.3 to 16.1 watts per square foot. A remarkably uniform temperature was found to prevail within the room as a result of the heating method presented.—L. W. Schade. Presented at the summer convention of the American Institute of Electrical Engineers, Chicago, Ill., June 26–30, 1933.

L. G.

**Physiologic Changes During Exposure to Ionized Air**—The influence of ionized air upon total metabolism, respiration, pulse rate, blood pressure and body temperature, was studied on human subjects under (a) basal conditions, (b) 2–4 hours after breakfast, and (c) 3–5 hours after a light lunch. Sixty persons in a total of 141 experiments were exposed for an hour or more to air containing from 5,000 to 1,500,000 small ions per cubic centimeter after a preliminary resting period of 1–2 hours in normal air.

The ionized air appeared to exert a normalizing influence upon the human mechanism by increasing or decreasing the physiologic processes under study.

The physiologic response to positive or negative ions did not differ greatly but certain differences were observed in the sensation produced by the two kinds of ions. The respiration of positive ions resulted in headaches and irritation of the nose and throat in some cases while negative ions predisposed to relaxation and other sensations of desirable character.—C. P. Yaglou, A. D. Brandt, and L. C. Benjamin. Presented at the Semi-Annual Meeting of the American Society of Heating and Ventilating Engineers, Detroit, Mich., June, 1933.

L. G.

**Carbon Monoxide Distribution in Relation to the Heating and Ventilation of a One-Floor Garage**—A study of the carbon monoxide distribution was made in a garage utilizing

various methods of ventilation. The air supply was made through large conical diffusers located near the ceiling for downward ventilation and located 4 inches above the floor level for upward ventilation.

The results showed that upward ventilation results in a lower concentration of carbon monoxide at the breathing line and a lower temperature above the breathing line than does downward ventilation.

Assuming the average rate of carbon monoxide production of an idling car to be 35 cubic feet per hour, an air change of 350,000 cubic feet per hour per car would be required to keep the carbon monoxide concentration down to one part in 10,000 parts of air.—F. C. Houghten and Paul McDermott. Presented at the Semi-Annual Meeting of the American Society of Heating and Ventilating Engineers, Detroit, Mich., June, 1933.

L. G.

**The Application of the Eupatheoscope for Measuring the Performance of Direct Radiators and Convectors in Terms of Equivalent Temperature**—The eupatheoscope, which is an instrument used as an index of the combined effects of air motion, radiation and convection, was used to determine whether the steam condensation of direct radiators and convectors could be correlated with the equivalent temperature as indicated by the eupatheoscope.

The study showed that the eupatheoscope served as a means of ranking various heating units in the order of the relative heating effects produced. The heating effect is not materially greater than the total heat output as measured by steam condensation under given standard conditions, and the authors feel that the practice of adding a large proportion to the condensation rating in order to provide for heating effect cannot be justified.—A. C. Willard, A. P.

Kratz, and N. K. Fahnestock. Presented at the Semi-Annual Meeting of the American Society of Heating and Ventilating Engineers, Detroit, Mich., June, 1933. L. G.

**Necessity for Bureau of Occupational Diseases, Connecticut**—Connecticut ranks third among the states in the percentage of her working population employed in manufacturing and mechanical industries. According to the 1930 Census, 309,465 persons, or 46 per cent of her working population, are so employed.

According to "Occupation Hazards and Diagnostic Signs," such workers are exposed to 700 hazardous occupations, some 500 of which are potentially dangerous to the health of the employees in Connecticut. The Bureau of Occupational Diseases has classified the hazardous materials, processes, and conditions into about 70 groups. At the same time, several thousand plants in the State were classified into about 100 industrial groups. This classification is so arranged that it may be correlated with that of the U. S. Census and of the National Council on Workmen's Compensation. The Bureau has made 1,373 field trips and 717 studies and surveys in various industries in the State (list attached). Each plant has received a confidential report of the Bureau's findings, including physical and chemical determinations of the working environment, with recommendations for the elimination or control of hazards found. Thus the health of several thousand workers was directly affected.

The report continues at some length with the conditions found; improvements noted; the centralization of information; industry's relationship to the industrial health problem, also that of the health department; the occupational disease program; the effect of industrial environment on health—in

which Dublin has shown that, age for age, the mortality rates of the industrial group run from one-and-a-half times to more than double the rates in non-hazardous occupations, and with a difference in life expectancy of seven years; occupational diseases vs. accidents, and the greater cost of the former; the necessity for control; the similarity to epidemics; the problem of new substances and processes; and essential control measures.

As it is the purpose of the State Department of Health to afford protection to all of the people of the State, the work of such a Bureau must be continued as an integral part of that duty. Forty-six per cent of the working population, embracing one-sixth of the population of the State, and representing a large income-producing portion, is not to be discriminated against and deprived of an essential protection. (Appendices attached.) — Connecticut State Department of Health (Hartford), 1933, 20 mimeographed pages plus Appendices. E. R. H.

**Indices of Air Change and Air Distribution**—The present ventilation code of the American Society of Heating and Ventilating Engineers makes use of the carbon dioxide content of the air of the environment under test as an index of air change. And variations in the CO<sub>2</sub> content as an index of air distribution. Realizing that human beings liberate heat and moisture in addition to CO<sub>2</sub>, the authors of this paper have made a critical study of changes in air temperature, moisture content and CO<sub>2</sub> content in an effort to determine the most satisfactory index for future use.

Tests were conducted in a psychrometric chamber on 10 subjects. The calculated values of air change determined from CO<sub>2</sub> and moisture increase indicated a somewhat higher air change than that actually supplied by the ventilating system. The dis-

crepancies noted were not significant. The use of the dry-bulb temperature rise as an index is precluded because a large part of the liberated heat is absorbed by the surrounding walls and objects.

The determination of air change from the increase in moisture content is recommended because of the rapidity and simplicity of the method and because of the greater consistency shown in the determinations.

It is suggested that an air motion of from 20 to 50 ft. per minute, determined by the kata thermometer, be used as an index of satisfactory air distribution.—F. C. Houghten and J. L. Blackshaw, *Heating, Piping and Air Conditioning*, V, 6:324-330 (May), 1933. L. G.

**Occupational Disease Compensation, Pennsylvania**—The conclusions of the special Commission are first given, which were signed by all of its 10 members, composed of physicians, representatives of self-insurers, child health, underwriters, miners, and employers, with T. Henry Walnut, Philadelphia attorney, as chairman.

In brief, the Commission found that compensation for occupational diseases could be set up constitutionally; that a separate act would be required with its own rules for procedures; that special provisions were necessary to fit the slow development and course of occupational diseases; that assistance of scientists would be essential as well as a schedule listing of special diseases; that a general statement of the occupations concerned is also necessary; that definite articles should be drawn up to protect the fund as well as employers; that silicosis and/or miners' asthma would present the greatest difficulties in administrative problems; that a board of experts should therefore be appointed whose findings would be conclusive; that it would be impossible to estimate the cost of such a scheme accurately in

advance; that the wisdom of an occupational disease enactment was outside of the commission's pronouncement; and that a survey should be made by the U. S. Public Health Service of the exact nature and prevalence of chronic incapacitating miners' asthma.

Scope and cost, legal aspects, definitions, a survey of acts in other states, rules established by judicial decisions, reasons for omitting additional diseases from the suggested schedule, and recommendation that a medical board be set up as an integral part of the administrative body, are among the features further discussed. There is also a special report of the legal committee and of the committee on scope and cost, also much other material of coördinate value.—Pennsylvania Commission on Compensation for Industrial Disease to Governor Pinchot, Harrisburg), 1933, 96 pp. E. R. H.

**Industrial Medicine in France**—A Decree issued by the French Minister of Education on April 11, 1933, provides for the establishment of an Institute of Industrial Hygiene and Medicine at the Paris School of Medicine in place of the Industrial Hygiene Institute.

The object of the new foundation is to provide training in occupational hygiene and pathology for doctors who intend to practise in industry. It will contain a Hygiene Section, a Medical Section devoted to clinical study of occupational diseases, and a Toxicological Section.

The Institute will give instruction in the form of two introductory courses on industrial hygiene and industrial medicine, and an advanced course on industrial hygiene, medicine, and toxicology. In addition to lectures on theory, there will be opportunity for practical work, visits to factories, examination of workers; etc.—*Indust. & Labour Inf.*, XLVI, 7:177 (May 15), 1933. E. R. H.

**Obituary—Sir Arthur Whitelegge**—Benjamin Arthur Whitelegge died April 25, 1933, at the ripe age of 80 years. He was born in Tideswell, Derbyshire, graduated in medicine in 1876 from the University College, and was a member of the Council of the Royal Sanitary Institute with which he had been associated for over 50 years.

Dr. Whitelegge will be chiefly remembered by our readers as His Majesty's Chief (Medical) Inspector of Factories at the Home Office, which post he held from 1896 to 1917, in which latter year he was followed by Sir Thomas Legge. Under Whitelegge's leadership the Factory Department was greatly increased in both personnel and influence.

Considered a master of English, he was also the author of a compact textbook on Hygiene and Public Health which ran through 17 editions—the latter editions in co-authorship with Sir George Newman. Dr. Newman credits him with being "the man who established intimate relationship between the factory medical service and the public health service."—*J. Royal San. Inst.* (May), 1933, Supplement p. 198. Also a fine tribute (with portrait) by Sir George Newman in *Lancet*, V, 5723:990 (May 6), 1933. E. R. H.

**Silicosis and Tuberculosis Among Miners of the Tri-State District of Oklahoma, Kansas, and Missouri—I.**—This Report is for the year ending June 30, 1928, and is the first of a proposed series dealing with the data concerned. An earlier investigation, begun in 1923, by the U. S. Bureau of Mines and completed in 1925, showed less dust in the mines of this, the Picher district, than in the Joplin district, reported in 1915 (Technical Paper No. 105). The present investigation is the result of an agreement between the Metropolitan Life Insurance Company, the Bureau of Mines and the mining

companies. The first year's proceeds were expended in constructing and equipping the clinic.

Of 7,722 examined at Picher in the year ending June, 1928, 1,617 (21.3 per cent) were diagnosed as having silicosis; 267, silicosis plus tuberculosis; and 104, tuberculosis alone.

An analysis of examination-records, subjective symptoms, physical examinations, X-ray findings, prognosis and treatment of silicosis is given. Appendix I gives the technic of radiographic work; II, the symptoms of silicosis by stages; III, the pathology of silicosis, and IV, the Picher mining district, with map.

Prognosis in early silicosis is considered good if the patient can be removed from a dusty occupation and placed in the open, but advance of the disease, especially with the superaddition of tuberculosis, renders the outlook less favorable. In the Picher field, pneumonia is a frequent complication, from which the death rate is high. Treatment recommended is removal from the dust to "open air." For complicating tuberculosis, a high, dry, warm climate is recommended. The men do much better when they go to the Southwest.—R. R. Sayers, F. V. Meriwether, A. J. Lanza, and W. W. Adams, U. S. Bureau of Mines, Technical Paper 545, 1933, 30 pp. (illus.).

Paper No. II, for the year ending June 30, 1929, shows some reduction from the number of cases of silicosis found in the previous year, also in the number complicated with tuberculosis, but the number of cases of tuberculosis rose. Apparently, a total of 154 of the 2,110 essentially negative cases of the previous year had progressed to first-stage silicosis, 2 to first-stage silicosis plus tuberculosis, 10 to early tuberculosis, 1 to moderately advanced tuberculosis, and 1 to advanced tuberculosis. Similar progressions (figures given) was noted for others who were previously

reported in the early stages of silicosis.

The etiology of silicosis is discussed in relation to age, personal history, past history of diseases and defects, and of previous occupations. Subjective symptoms of the disease, and the findings of physical examinations, X-rays and laboratory, are also discussed in some detail.

The action of silica dust in the formation of fibrosis probably continues for 12 to 18 months provided a non-dusty occupation is sought and infection is avoided. Prevention at the mines is discussed, also removal to the high, dry climate of the Southwest. Patients do better with a limited amount of daily exercise.—F. V. Meriwether, R. R. Sayers, and A. J. Lanza, U. S. Bureau of Mines, Technical Paper No. 552, 1933, 28 pp.

E. R. H.

#### Occupational Disease Decisions—

1. A painter who sprays automobiles with wood alcohol in a small, poorly ventilated room and, as a result, suffers a disabling illness, is disabled, not by an occupational disease, but by an accidental personal injury, and under the Oklahoma workmen's compensation act is entitled to compensation.—J.A.M.A. (Medicolegal), (June 3), 1933, p. 1894.

2. A laborer working under the direction of a county surveyor was overcome by smoke while burning brush along a country road. He applied for compensation for disability but died before the claim was considered. After investigation the claim was approved.—*Monitor*, Ohio Indust. Comm., (June), 1933, p. 780.

3. An employee lifted one end of a gasoline engine weighing 300 pounds. He quit work immediately and the next day was operated upon for acute appendicitis. The claim for compensation was approved, the Commission holding that appendicitis can be brought

on by a strain or an injury to the right side of the abdomen.—*Monitor*, Ohio Indust. Comm., (June), 1933, p. 780.

4. A painter ordered to paint a fence was compelled to tear away vines and shrubbery by which he came in contact with poison ivy. He was disabled for almost a month. His claim was allowed by the Commission as an injury claim.—*Monitor*, Ohio Indust. Comm., (June), 1933, p. 780.

5. An employee carried sacks of stucco, weighing 100 pounds, up a flight of 22 steps. After carrying 8 such sacks he became dizzy and fell down the stairs. Two days later a physician found him suffering from acute cardiac dilation. His claim was considered meritorious and allowed.—*Monitor*, Ohio Indust. Comm., (June), 1933, p. 781.

E. R. H.

**Ventilation of Factories and Workshops**—Conditions are stated for satisfactory ventilation including importance of air movement, cooling power, and the effects of impurities. The standards involve ventilation itself, air movement, temperature, and humidity.

Natural ventilation which pertains to every workroom, to some extent, requires efficient openings of adequate size and suitability (which are discussed and illustrated). Much space is next given to the use of fans with illustrations of the propeller, pressure, and circulating types.

Mechanical ventilation systems of the extraction, plenum and combined types are described and illustrated. There is a note upon heating and a brief description of the instruments and apparatus for ascertaining atmospheric conditions.—Great Britain, Home Office, Welfare Pamphlet No. 5, 2d Ed., 51 pp., 1933. Price 1s. (British Library of Information, 270 Madison Ave., New York.)

E. R. H.

## FOOD AND NUTRITION

**The Copper, Iron and Manganese Content of Fish**—Twenty species of fresh water and salt water fish were used in the experiment. The average copper content of both the salt water and fresh water fish was about the same, or 2.5 mg. per kilo. of moist material. The sunfish showed the lowest average copper content (1.4 mg. per kilo. of moist material), while the ling was the highest (4.1 mg.). Salt water fish was found to contain approximately 12 per cent more iron than fresh water fish. Cod fish and sunfish showed the lowest amount of iron (3.4 mg. per kilo. of moist material) while ling showed the greatest amount (9.6 mg.). Fresh water fish contained more manganese than salt water fish. The various species of fish muscle contain about 0.1 mg. to 0.4 mg. per kilo. of moist material. Species of fish with dark colored tissue contain approximately 75 per cent more iron than the species with the light colored tissue.—Thomas B. Parks and Embree R. Rose, *J. Nutrition*, 6:95 (Jan.), 1933.

**Vitamin G (B<sub>2</sub>) in Fruits**—A study was made of fresh apples, avocados, oranges, and pears for vitamin G. Young albino rats, 21 days old and weighing 35 to 40 gm., were placed in metal cages with raised screen floors, and given distilled water and a basal diet deficient in vitamin G. At the end of two weeks, each animal was given a daily weighed portion of the material to be tested in addition to the basal diet. The apples used were Arkansas grown Delicious. Experiments were also made with Washington grown Delicious but the results were similar to the former. Bartlett pears, California oranges and avocado (Fuerte

variety) were the other fruits tested. Apples and oranges were found to be poorer in vitamin G than such root vegetables as beets, carrots, potatoes, and turnips. Avocados and pears were found to be better sources of the vitamin than the root vegetables but poorer than the leafy ones. Oranges and apples each contained about one-fifth Bourquin-Sherman unit per gram of the fresh edible fruit; avocados contained about two-thirds unit per gram, while pears were found to contain one unit per gram.—Paul L. Day and William J. Darby, *J. Home Econ.*, 25: 319 (Apr.), 1933.

**The Chemical Nature of Vitamin C**—The authors here undertake to show that hexuronic acid itself and not a contaminant is responsible for the antiscorbutic activity. In accordance with recent chemical analysis, this term is dropped and for it "ascorbic acid" is substituted. Adrenal glands are the only materials suitable for large scale preparations of ascorbic acid. Owing to the difficulty in securing these, investigation was made of vegetable sources. One apparently has been found in the Hungarian red pepper, *Capsicum annuum*, which shows a high reducing power. A method is given for preparation of the ascorbic acid from these red peppers following which the authors finally obtained yellow crystals melting at 187 to 189°. Guinea pigs were protected against scurvy for 65 days with 0.5 mg. of this substance. On recrystallization, crystals were obtained melting sharply at 192°, the product corresponding to a pure preparation of ascorbic acid. In order to prove that contaminants were not responsible for the biological activity, a

derivative, monoacetone-ascorbic acid, was prepared. This monoacetone derivative is only partly protective but ascorbic acid recovered from the derivative is completely protective. The test with different substances for a 65 day period on 250 to 350 gm. animals showed full protection was secured with 1.5 c.c. lemon juice added to the basal diet and when the animals were given 1 mg. ascorbic acid prepared from the acetone derivative, or 0.5 mg. ascorbic acid prepared from the paprika. Very good results were also secured with 0.5 c.c. paprika juice, with 1 mg. monoacetone-ascorbic acid and with 0.5 mg. ascorbic acid, recrystallized five times, obtained from adrenal glands. In an experiment to determine the stores of ascorbic acid in the adrenal glands of animals, it was found that this rapidly disappears when the animals are on a vitamin C-free diet.—Joseph Louis Svirebely and Albert Szent-Györgyi, *Biochem. J.*, 27:279, 1933.

**The Effect of Cooking on the Vitamin A and C Content of Fresh and Dried Apricots**—This study involves the effect of cooking on the retention of vitamin C in dried fruits—peaches, prunes, and apricots—both sulfured and unsulfured, supplementing previous reports from this laboratory showing the protective value of sulfuring on vitamin C, and to a lesser extent, on vitamin A. The question was raised by Nelson and Jones of the U. S. Department of Agriculture, who, in unpublished work, observed that the effect of sulfuring would be of little practical value since cooking tended to destroy vitamin C. This experiment aims to answer two questions, the effect of cooking in the case of sulfured and unsulfured apricots and the effect of processing and re-sulfuring. The fruit was cooked by bringing the temperature to 85° C in 15 minutes and maintaining that temperature for 5 minutes.

The technique was that followed in previous experiments with a total feeding period of 60 days. Comparisons of the vitamin C content of the raw and cooked fresh apricots show in every instance that the raw product is much more antiscorbutic than the cooked, 15 gm. of the fresh raw apricot affording full protection against scurvy, as against more than 20 gm. for the cooked fresh fruit, indicating a probable loss of 30 to 50 per cent of the vitamin C through cooking.

Comparison was made between the raw and cooked, sulfured and sundried apricots, and the same fruit after storage at room temperature for one year and the unsulfured, sundried and dehydrated. In the case of the sulfured and sundried, there was a retention of 94 to 100 per cent of both raw and cooked. The same after a year's storage showed only 40 per cent retention. The raw, unsulfured, sundried and dehydrated showed no retention of vitamin C. Both raw and cooked, sulfured and sundried showed approximately a 50 per cent retention. In the storage experiment, there was a loss of 31 per cent of the sulfur dioxide as well as 60 per cent of its antiscorbutic value. After cooking there was a further loss of more than 50 per cent of the sulfur dioxide but no parallel loss of vitamin C.

Fifteen and 25 gm. respectively of the raw fresh and cooked fresh apricot are regarded as protective. Since the equivalent of 16 gm., either raw or cooked, in the case of sulfured fruit furnishes practically complete protection, it is concluded that the full vitamin value of the fresh apricot is retained. Sulfured apricots held at room temperature for 5 months and then commercially processed show a loss of approximately 50 per cent of vitamin C, as against practically no loss of this vitamin when stored at 0° C, showing that freezing storage is necessary to preserve vitamin C. In the case of



vitamin A, less variation is shown between the raw and cooked sulfured fruits. According to the results of the experiment, 26 to 41 per cent of vitamin A is preserved in the raw sulfured fruit, and 25 to 33 per cent in the same fruit cooked. Vitamin A is retained to the extent of 16 to 28 per cent in the raw unsulfured dried fruit, against 9 to 20 per cent, cooked. Again attention is called to the unusually high vitamin A content of apricots, which is attributed to their pigmentation by carotene, reported by Morgan and Madsen (*J. Nutrition*, 6:83 [Jan.], 1933—see following abstract). The fact that cooked fresh fruit shows a higher vitamin A value is attributed to better intestinal utilization either because of enzyme destruction or better carotene absorption. The calculated losses of vitamin A due to the drying process are 59 to 74 per cent in sulfured, 76 to 82 per cent in unsulfured, and 71 to 82 per cent in processed fruit.—Agnes Fay Morgan, Anna Field and P. F. Nichols, *J. Agr. Res.*, 46:841 (May 1), 1933.

**Mottled Enamel Produced by Water Containing Sodium Fluoride**—While McCollum and coworkers in 1925 reported the unusual growth of the upper incisors of rats fed sodium fluoride, credit is given to Smith, Lantz and Smith as the first to associate experimental fluorosis in the rat with the condition known as mottled enamel. A so-called "mottled enamel area" exists at Conway, S. C., and the municipal water supply has been shown to be high in fluorine—six parts per million. The object of this experiment was to compare the changes in the teeth of white rats fed small quantities of fluorine in the drinking water with those produced by natural water from a mottled enamel area. Experimental rats were placed on a leached casein and cornstarch diet supplemented with yeast, cod liver oil and salt mixture, the latter contributing

about 10 parts per million of fluorine to the diet. Groups of 6 rats were fed for about 100 days on this basal ration, the drinking water used in the various experiments being as follows:

Group 1, distilled water.

Group 2, municipal water supply of Conway, S. C., 10 times concentrated. This would make the fluorine content approximately 60 parts per million by the ferric chloride method of Churchill which was employed by the authors.

Group 3, synthetic water of the same composition as the concentrated Conway water except that it contained no fluorine.

Group 4, a similar synthetic water containing 150 p.p.m. of sodium fluoride (equivalent to about 68 p.p.m. of fluorine).

Group 5, distilled water plus 500 p.p.m. of sodium fluoride (equivalent to about 226 p.p.m. of fluorine).

Groups 1 and 3 (water containing no fluorine) grew normally and presented no evidence of disease. Teeth showed the normal orange color at all times. Groups 2 and 4 (water containing approximately 60 p.p.m. of fluorine, in the form of natural fluorine and added sodium fluoride, respectively) grew normally with the exception of the following gross pathological changes noted in the teeth: Within 10 days the normal orange color had disappeared from the labial surfaces of the lower incisors, which appeared whitish except for an opaque orange spot at the tip of each tooth. Within the next week they became a translucent white throughout. Within 52 days small brown spots appeared on the labial surfaces of these incisors. During the remainder of the feeding period these spots increased in number and gradually covered the entire surface of the teeth. Group 5 (distilled water containing 226 p.p.m. of fluorine as sodium fluoride) gained in weight 3 days, lost weight during the next week, and thereafter showed a more or less normal gain with the exception of one rat which died after 11 days' feeding. This experiment was

repeated with 20 rats and 16 of these died within 11 days, indicating that fluorine in these amounts has a distinct acute toxic effect. The surviving rats showed the same tooth changes as Groups 2 and 4, during the first 10 days but by the end of 52 days the teeth were chalky white and brittle and many of them had broken off at the tips or even at the gums, and the opposing teeth had become abnormally long, tending to curve upward and penetrate the palate.

The work confirms in general the conclusions of Smith, Lantz, and Smith that endemic tooth mottling is definitely due to fluorine in the drinking water. —W. H. Sebrell, H. T. Dean, E. Elvove, and R. P. Breaux, *Pub. Health Rep.*, 48:437 (April 28), 1933.

A Comparison of Apricots and Their Carotene Equivalent as Sources of Vitamin A—Royal apricots, having a deep yellow flesh, were chosen for the test. The carotene con-

tent of fresh frozen, sulfured sundried and unsulfured sundried apricots was determined by pyridine and by acetone ether extraction followed by colorimetric estimation. The fresh frozen apricots which were used for the vitamin tests were found to have a maximum of 0.102 mg. carotene per gram of fruit solids compared with 0.066 and 0.060 mg. for the sulfured and unsulfured samples, indicating losses of 36 and 41 per cent of the carotenoid values during drying. A daily dose of 15 mg. of the fresh fruit gave an increase of 3 gm. body weight per week. Twice the equivalent of this amount must be fed as either sulfured or unsulfured sundried apricots in order to obtain about the same amount of growth. In nearly all cases the unsulfured dried apricots yielded growth in proportion to carotene intake which was distinctly lower than the other sources of carotene used. —Agnes Fay Morgan and Evelyn O. Madsen, *J. Nutrition*, 6:83 (Jan.), 1933.

## PUBLIC HEALTH NURSING\*

Health Education Conference at Ann Arbor—The tone of the conference on health education, held at Ann Arbor under the auspices of the American Child Health Association, was definitely educational. There were no suggestions as to what the doctor or nurse as such should do, but what should be taught for the good of the child.

No one knows definitely yet what health education practices prove best for the child. There was much discussion pro and con as to the value of weighing and measuring school children and as to whether the school or community should be responsible for milk, hot lunches, filling children's teeth, etc. Some felt that unless an activity was purely educational (in some cases for demonstration, perhaps) it had no place in the budget of school authorities.

The question of the abiding values of Gold Star and Blue Ribbon Campaigns was argued again pro and con.

Health Education is rapidly changing from formal education to progressive education in which practice rather than theory is stressed. In assisting teachers, efforts are made first to have them develop a point of view, then to guide experience. The old conception of health education was to teach how to prevent sickness, now it is to promote healthful living. The content has been changed also: we used to give advice on what not to do, now we try to control the factors in the environment in which we live.

There was general agreement that there needs to be more research work done in the field of health education.

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

The League Meeting in Chicago—The National League of Nursing Education, which is composed of superintendents, instructors, supervisors, and all other nurses acting in a teaching capacity in nursing schools, held its 1933 annual meeting at the Drake Hotel in Chicago the week of June 19.

It was in 1893 at the World's Fair in Chicago that the League was formed under the original name of the American Society of Superintendents of Training Schools for Nurses and it seemed fitting that the 40th Anniversary of the League should be held at the time of the Century of Progress Exposition in Chicago.

It is significant that one whole day's program was devoted to a discussion of ways to improve obstetrical nursing. As a result of the discussion the American Nurses' Association and the League pledged themselves to make better obstetrical nursing a project for the coming year.

Another whole day of the program was devoted to a discussion of the need for psychiatric nursing. A map was displayed showing the distribution of graduate nurses in the psychiatric hospitals in the United States. Some states, like Minnesota and New York, made a good showing; others showed no trained nurses in any of the psychiatric hospitals.

One day of the League meeting was devoted to problems of state boards of nurse examiners.

One of the features of the program was the presentation of the Saunders Medal for distinguished service in nursing to Clara D. Noyes, R.N., National Director, American Red Cross Nursing Service, Washington, D. C., by

Dr. Malcolm T. MacEachern of the American College of Surgeons.

The N.O.P.H.N.—When the National Organization for Public Health Nursing was founded in 1912, there were fewer than 3,000 public health nurses in this country. Now there are approximately 20,000 and about 6,300 are members of the N.O.P.H.N. Every public health nurse in New Mexico is a member for 1933. Rhode Island comes next with an enrollment percentage of 96, District of Columbia ranks third with 87 per cent, Oklahoma and Iowa fourth and fifth with 72 and 69 per cent respectively. Michigan comes sixth with 68 per cent. Fourteen states are more than half enrolled and in half the states 40 per cent or more of the public health nurses are members of the Organization.

The N.O.P.H.N. is interesting because it is a national organization which includes both professional and lay-workers in its membership. The interest and support of a well informed citizen's group is considered to be an essential factor in the successful development of every public health nursing agency; it is this fact that accounts for the lay members.

In the list given below are recounted some of the accomplishments of the National Organization for Public Health Nursing during the past two years:

1. Published *Objectives of Public Health Nursing and Qualifications for Public Health Nurses for 1935*.
2. Prepared two books: a revised edition of the *Manual of Public Health Nursing and Principles and Practices of Public Health Nursing Including Cost Analysis*.

3. Took a "1931 Census of Public Health Nurses in the U. S. A."
4. Gave advisory and consultation service in the field in nearly all the states in the union.
5. Conducted social hygiene and tuberculosis institutes in over half the states and institutes for board members in more than a dozen states.
6. Published monthly the magazine *Public Health Nursing*, the only magazine in the world devoted solely to subjects related to public health nursing.
7. Maintained a vocational guidance and placement service in the Joint Vocational Service.
8. Gathered facts on the economic emergency which have been used to stabilize local public health nursing situations.
9. Carried on a nationwide correspondence of approximately 600 letters monthly.
10. Continued to recommend minimum requirements for post-graduate courses in public health nursing.
11. Conducted and published an annual public health nurse's salary study.
12. Offered special service to boards and committees through a lay staff member and, through her, also conducted an educational study program for them.
13. Prepared 13 bibliographies in relation to various aspects of public health nursing and made them available on request.
14. Continued to publish public health nursing record forms.
15. Continued the work of the School Nursing Section and published a special school nursing number of the magazine each September.
16. Continued the work of the Industrial Nursing Section and published material for industrial nurses; also prepared a book *Nursing in Industry* soon to be published.
17. Planned a survey of public health nursing throughout the country.
18. Developed and fostered relationships with many of the National Health Agencies in this country.

#### REFERENCES

*Listening In*, N.O.P.H.N. Releases in June, 1932, and May, 1933.

## EDUCATION AND PUBLICITY\*

Health Education at Indianapolis—Elsewhere in the *Journal* you will find the outline of the Health Education Section's program for the October convention at Indianapolis.

Under the title, "Organization of Adult Groups for Health Education," the first session will deal with the problem of health teaching for those members of the adult population who do not belong to service clubs, parent-teacher associations, church societies and other groups already organized and ready to welcome speakers on health subjects. Those who most need health teaching are least likely to be members of these organized groups. They need the methods of a class, meeting in at least four or five sessions. How can they be found, brought together in groups and held together long enough to learn some of the elementary facts about health? The speakers in this session will tell of methods used in reaching this section of the public.

"Retailing Health Information and Ideas" makes another approach to the problem of how to put salt on the bird's tail. First catch your bird, but how? In this session the whole question of distribution within a single city will be discussed. How do you find your market for health education? How do you cover it? Three hypothetical campaigns are to be outlined, all of them requiring well planned and thorough distribution.

Are there certain objectives on which all health organizations and health departments can unite in what they tell

the public? Is it possible that the combined forces of the health agencies might bring about much stronger support for public health work? It is the aim of the panel session, in which six or seven leaders in public health will participate, to arrive at an agreement on one or more common objectives which might be made the basis for intensive health publicity during the coming year. Our joint session with the Vital Statistics Section will consider news values in statistics, with special attention to ways in which the significance of national statistics can be interpreted in relation to local situations.—Mary Swain Routzahn.

Again Education and Publicity Headquarters will be a feature of the Annual Meeting. Have you material for display? Have you ideas as to what should be displayed? Please write editor of this department.

A Century of Progress—Chicago has put on a splendid show. The strictly public health exhibits are few, but many other displays in the medical section of the Hall of Sciences will interest health workers. Here are some notes supplied by the exposition management:

The first X-ray photograph ever used in surgery—two months after the discovery was announced by Roentgen in 1895—is in the exhibit of the medical department of McGill University of Montreal, Canada, in the Medical Section of the science exhibits.

The display of the Medical Sciences visualizes the tremendous advance in the past century in the knowledge of the causes, detection, prevention and cure of human and animal diseases. Scientific medical institutions of England, France, Germany, Austria, Italy, Holland and Canada have cooperated with the American associations.

---

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

The transparent Man, from the Deutsches Hygiene Museum of Dresden, Germany, is a life size model, of transparent cellon, the interior of which is illuminated to show in rotation all the deep organs of the body.

Also in this exhibit are moving models of parts of the body which may be operated by the visitor, showing the action of joints, operation of the breathing apparatus, circulation of the blood, the larynx in different states, and horizontal sections of the body, shown in a life size model in eight parts.

The works of Louis Pasteur, pioneer of bacteriology and of Robert Koch, who discovered the tubercle bacillus, are shown in commemorative exhibits.

Structure and function of the nervous system are demonstrated by the Central Institute for Brain Research of Amsterdam, Holland.

An extensive exhibit of work in bacteriology and tropical diseases of man and animals is that of the Wellcome Research Institution of London. The Institution shows models of the floating laboratory presented to the Sudan government on the Nile and of the mobile field laboratory given the British War Office during the World War.

Progress of hospitals in the past century in America is shown by the American College of Surgeons. The American Medical Association uses dioramas, mechanical displays and transparencies to show the evolution of medical care. The American Pharmaceutical Association illustrates the evolution of medicine dispensing from an old-time pharmacy to actual demonstrations of modern prescription compounding, assays and chemical tests.

History of blood transfusion is shown by the use of actual instruments in the exhibit of the Cleveland Clinic Foundation. Physiological relations of the thyroid, pituitary, suprarenal and sex glands are shown by specimens, models and charts.

The discovery of appendicitis in the last century is shown by Harvard University and the Massachusetts General Hospital. The development of abdominal surgery and work on the treatment of pernicious anaemia are among other subjects of exhibits.

Motion pictures, wax models, transparent photographs and charts are used by the Mayo Foundation to illustrate work on goitre, diseases of the digestive tract and of the nervous system. A large electric thermometer enables visitors to take the temperature of their hands and a thermometer enables them to test their nerve steadiness.

Rehabilitation of the crippled child is the subject of the University of Chicago exhibit. Motion pictures show results of work on

acute infantile paralysis. Models and photographs illustrate the possibilities of work on the spine.

The Georgia Warm Springs Foundation, for the study and treatment of infantile paralysis, founded and financed by President Franklin D. Roosevelt, exhibits photographs illustrating exercise and massage treatments for patients suffering from the results of the disease. A series of X-ray photographs of affected limbs show results of treatment.

Bright's disease is illustrated by specimens of organs and the relations between kidney disease and acute infections are shown by Marquette University and Milwaukee County Hospital.

The American Urological Association presents an exhibit on diseases of the urinary tract.

To demonstrate the fact that cancer is, to a great extent, curable if recognized and treated in early stages, is the purpose of the exhibits of the American Society for the Control of Cancer and of the New York City Cancer Committee. Influence of genetics on cancer is shown by the Otho S. A. Sprague Memorial Institute—University of Chicago—in records of 110,000 necropsies on mice in twenty-three years.

Importance of prenatal and post-natal care for babies is shown by the Maternity Association of New York. Questions and answers on maternal hygiene are shown by the Chicago Medical, Dental and Allied Service Women's Association.

The fight against tuberculosis is portrayed by the Chicago Municipal Tuberculosis Sanitarium and the Chicago Tuberculosis Institute.

Causes, prevention and treatment of rheumatism are shown by the American Committee for the Control of Rheumatism.

Care of the teeth and the progress of dental science are shown by the Chicago Centennial Dental Congress. Motion pictures, operating models, specimens, charts and transparencies are used to show methods of treatment and the relation of the teeth to the general health.

Relation of focal infections to systemic diseases is the subject of the exhibit of the University of Illinois and the Illinois Department of Public Health. The Chicago Board of Health shows the work for the control of preventable diseases in the city's past 100 years.

Loyola University, Chicago, shows a series of complete anatomical models. The University of Wisconsin presents the history of the pioneer work on gastric digestion, result of the observation 100 years ago of Alexis

St. Martin, whose digestive operations were visible as a result of a gunshot wound.

Health is represented in effective fashion in the social welfare section of the Hall of Social Sciences.

Public health and the medical sciences in general do not approach the German Hygiene Museum in graphic presentation. And in all the buildings we visited we noticed but a single use of the symbols or "fact-pictures" as developed so strikingly by Dr. Otto Neurath of the Social and Economic Museum, Vienna, for the presentation of statistical data.

Throughout the exposition light, color and form have been used to give settings for the displays, in addition to their large scale use outdoors in producing effects which delight the eye.

In the construction of scientific exhibits and those showing processes and products lavish use has been made of modern methods of graphic presentation. Many ideas may be taken over by the readers of the *Journal*, but naturally many of the forms used are possible because of funds available far beyond the resources of health and welfare agencies.

Much has been done to explain the exhibits to visitors. But largely the exhibitors overlooked the fairly recent studies which have been made in the museum field. And mere common sense would have bettered many exhibits in their audience contacts.

Typewritten labels were seen on elaborate, expensive scientific displays. Pages of *typewritten matter in capital letters* were seen. Signs, under glass, in small letters, all capitals, and above the eye level were used in an expensive commercial display.

Mechanical voices explained in many cases, but frequently the voice or the recording was not satisfactory. One of the successes was the easily recognized voice of Dr. W. W. Bauer in one of the

booths of the American Medical Association.

"Do you want to learn something about the exhibits?" or "Are there any questions I could answer?" was the unfortunate and rather futile way in which some of the human explainers approached visitors. If they had started telling some interesting fact or idea, and had pointed to the exhibit many of the visitors would have listened gladly. Few of the explainers had a pointer to hold the attention of visitors and to direct attention to the particular detail which was being discussed. Good explainers had audiences.

We hope that every delegate to the A.P.H.A. meeting at Indianapolis in October will be able to add at least a day at the Century of Progress.

What Have You?—Anything you have written or published, or have read which might be used in explaining the importance of any public health activity? Anything which other health agencies might use, or chests and federations which must soon face the enormous job of raising funds to keep going the non-official health activities in many cities?

Case stories, facts, statistics? Reports of studies which reveal situations or needs, or point to trends?

*Anything about results?*

Almost unlimited quantities of such material can be used during the next six months—in press releases, by magazine and syndicate writers, for bulletins to local agencies. And he helps most who helps quickly.

Address Miss Mabel Ellis, editor, United Educational Program, 130 East 22d Street, New York.

If you have something which should be mentioned in this department of the *Journal* please send a copy also to Evart G. Routzahn, 130 East 22d Street, New York.

**Again Behind the Front Lines—** Last year a series of bulletins, "Behind the Front Lines," was issued for those wanting fresh data for educational presentation of health and welfare work. Those bulletins were prepared first for use in the fall and winter money-raising campaigns. Then much of the material was used in the year round publicity of chests and individual agencies.

A new supplemental series is being prepared for issue in August. Four or five of the new series will present public health material. Any public or private agency may use the material, which is suitable for printed matter, house organs, newspaper copy, talks, etc.

The copy is prepared by the United Educational Program of the National Social Work Council. The bulletins are available for 10 cents a copy through Community Chests and Councils, Inc., Graybar Building, New York. Ask for a list.

**Sixty Is the Limit—**The 1933 Institute on Public Health Education will be held Saturday, Sunday and Monday, October 7-9, at Indianapolis. The general theme will be The Psychology of Health Education. Write the A.P.H.A. for details. Make sure that it will give what you want before signing up. Then you won't take the place of someone else.

**Broadcasting in Manitoba—**May 5, 1933, the 54th in a series of radio talks was given by representatives of the Manitoba Department of Health and Public Welfare. Some of the titles follow:

"The Place of Health in School Education"; "Child Health" (interview between a mother and her physician about underweight in children); "The Significance of the Common Cold"; "How Communicable Diseases Are Spread"; "The Aftermath of Communicable Diseases"; "The History of Vaccination and Preventive Inoculation";

"Common Skin Diseases"; "Maternal Welfare"; "A Christmas Well and Happy"; "Health Conditions in 1932" (a newspaper reporter interviews a health official); "The Scope and Aims of Mental Hygiene"; "Public Health Nursing Problems" (emergency conditions); "First Aid and Home Nursing" (a series of conversations between Ellen, an 8th grade girl, and her Aunt Mary, a nurse); "Scarlet Fever"; "Food Hygiene"; "Rural Sanitation"; "Sanitation and Housing"; "Vital Statistics" (series of three on their why and wherefore); "Diphtheria Prevention" (series of 3).

A full list and single copies are available. Address Anna E. Wells, Health Education Service, Department of Health and Public Welfare, Winnipeg, Manitoba.

**Institute for Visual Education—**Many of our readers know something about the method of graphic presentation developed by Dr. Otto Neurath in the Social and Economic Museum, Vienna. The method—

reduces complicated facts to their bare essentials and transforms them into pictures—attractive modern symbols which everyone can understand.

The Neurath method is based on the theory that it is better for the average man or woman to remember simplified pictures than to forget detailed and intricate figures. The Neurath fact-pictures are so clear and striking that they can be comprehended at a glance and are far more easily remembered than figures in type.

The Neurath charts have been widely used in Europe. American organizations, research workers and writers, however, have been seriously handicapped in using Dr. Neurath's method because of the difficulties and loss of time involved in ordering material from Vienna. An American agency is urgently called for which will make the Neurath technique applicable to American conditions, and charts readily available in this country.

An Organizing Committee for an Institute for Visual Education has been formed, and invites correspondence with those interested. Vital statistics are happily adapted to this striking form of presentation. Address Rudolf Modley, field secretary, 130 East 22d Street,



New York. Bertrand Brown of the Milbank Memorial Fund represents public health on the committee.

In the final organization we hope that a different name will be selected, since "visual education" means so much more in the school world in the United States than any single form of presentation of facts.

**Health Examinations But a Part of a Whole—***The Health Examiner*, with the June, 1933, issue—

appears in a new form and under new auspices. Established in April, 1931, *The Health Examiner* has until the present been published by The Greater New York Committee on Health Examination. With this number the publication comes under the supervision of The New York Academy of Medicine, 2 East 103d St., New York City.

The events leading to the change in publication auspices reflect the growth of medical appreciation of the nature and significance of the health examination movement. *The Health Examiner* was created to propagate health examinations. Its first and early issues were devoted to the description of the technique in examining the apparently healthy individual. Many contributions from leaders of the medical profession were published, extolling the merits of the health examination. Some space and consideration were devoted to certain practical problems such as equipment, record keeping, follow-up, etc.

The editorial statement indicates a new approach to the health examination:

Time and accumulated experience, however, convinced the editorial board that the health examination idea could not effectively be promoted of and by itself. The examination of the apparently healthy individual is merely one phase of the practice of personal preventive medicine. Unless the health examination is made with this understanding, it is liable to prove an ineffective gesture, promising more than it could possibly achieve, and in the long run it would defeat the very ends at which it is aimed.

Dr. Iago Galdston, as a member of the editorial board, is largely responsible for the content of the magazine. Of considerable value to

many public health workers. \$1.00 a year; 10 cents a copy. Specimen copy free.

**Emergency Relief Diet Demonstration—**Already we have mentioned danger in demonstration of local relief diets, unless the public is informed as to the limitations in those diets. The *News Bulletin* of the Social Work Publicity Council, 130 East 22d Street, New York, refers to one attempt at public explanation:

In the April issue we gave the opinions of some social work leaders about the wisdom of drawing attention to relief food budgets by reporting formal dinners of campaign workers or other laymen where relief budget meals were served. You may judge for yourselves, therefore, the constructive value of the way the Cleveland News presented the Associated Charities' food budgets. A staff reporter and his family lived a week on the food a client would have, and the reporter wrote daily of their experience. The tone of the writing was light and readable, helped along by pictures of the family planning, preparing and consuming the meals. The conclusions seemed to be that it was not a great hardship for a week, but that even for that length of time it took careful planning. It is certainly well for the public to know what clients are expected to live on, and maybe this is one acceptable way for the realization to reach them.

**Inner-Convention Interpretation—**The strictly medical discussions in the annual meeting of the National Tuberculosis Association include the presentation of developments of much significance to the administrators of state and local tuberculosis associations. Many of the administrators are without medical training. All of them have a full-time job at the annual meeting in keeping up with the important sessions of the Sociological and Administrative Sections.

Near the close of the conference a special session was held for the non-medical delegates in which the significant utterances in the Pathological and Clinical Sections were reviewed.

The selecting and interpreting was done by Drs. Esmond R. Long and Iago Galdston. They were interesting and effective.

**Health Material in Libraries—** Have we given enough attention to health books and periodicals in public, school and other libraries—to the useful possibilities, and the dangers as well?

In "Social Hygiene and the Libraries," Pearl A. Winchester reports on a study made with the coöperation of public, school, state, normal school, medical school, and university libraries, including 22 in Canada.

The returns show a fairly generous number of books, with a rather high average in quality. The report gives considerable interesting detail as to the particular books found most widely in the different types of libraries.

Most widely distributed were titles by Wiggan, Darwin and Jane Addams, along with several titles from the list of selected books issued by American Social Hygiene Association.

The report discusses the problem of "closed shelves"; also subject headings for library catalogues. In *Journal of Social Hygiene*, 450 7th Avenue, New York. June, 1933. 35 cents.

#### HEALTH PLAYS

The *Bulletin* of the National Tuberculosis Association reports:

"Shadows," a health play by Mrs. Alice McGouldrick, Executive Secretary of the Maine Public Health Association, was recently published by that association and is available for distribution through their office, 256 Water Street, Augusta, Maine.

The play is well written and presents two contrasting scenes. The first scene is laid in 1882 and tells the story of a tuberculous family with the shadow of despair hanging over them before the discovery of the tubercle bacillus and modern public health organization. The second scene is in 1932 and takes place in the office of a public health nurse or tuberculosis association. It tells the story of

the modern organized campaign against tuberculosis. The play is simple in scenic requirements and could easily be presented by any local group, and may also be altered in the last scene to fit local conditions.

For the following address your state tuberculosis association:

"Thanks for Health Day," a playlet for grade, rural, private and parochial schools and "A Trip to Yesterday," a pageant for the high schools, are the titles of the two new programs which have been arranged for the schools of the nation for presentation on Thanksgiving Eve, Wednesday, November 29.

These two plays are offered in place of the school stories of former years and as a means of keeping in step with modern trends which call for dramatization of the story of the Seal. . . .

Both programs, which are timed for less than an hour, close with the distribution of bangle pins (small double barred crosses) and as the pupils receive their pins they will be asked to "tell two" (the 'tell two' pledge) people the story of the Seal as they have learned it through the program. . . .

Included with the "Thanks for Health Day" program is a list of ten class room activities and the whole is set up attractively in clip sheet style (all spread out on one sheet so that the teacher has only to cut it apart for the various assignments). A poster and bangle pins must accompany the clip sheet and two clip sheets are required for each teacher—one to cut up and one for copy.

#### HONORABLE MENTION

To National Society for the Prevention of Blindness, 450 7th Ave., New York City: for giving the addresses of all periodicals mentioned under "Current Articles of Interest," a department in *The Sight-Saving Review*, a quarterly magazine.

Health workers are too busy to go to a public library, where they may or may not locate the addresses of periodicals, copies of which they wish to order.

#### HEALTH WORK IN SCHOOLS

References which we have not examined under the above heading have been listed in *Library Index*:

Campbell, Alfred. The development of a health program in a rural consolidated school. *Hoosier health herald* (Indianapolis, Ind.) 14: 109-12, June, 1933.

Kincaid, W. A. Health-service activities. *School executives magazine* (Lincoln, Neb.) 52:343-44, June, 1933.

Jackson, Edward, M.D. Health examinations in schools. *Colorado medicine* (Denver) 30:215-18, June, 1933.

Measurement of malnutrition in school children. *Lancet* (London) 224:1311-12, June 17, 1933.

Schrader, E. L., M.D. Student-health-service facilities. *Hospital progress* (St. Louis) 14:249-50, June, 1933.

Wrightstone, J. W. Trends of medical and nurse services in the public schools of New York State. *Elementary school journal* (Chicago) 33:769-76, June, 1933.

*Library Index*, "a weekly index to current periodical literature in the field of public health"; issued by National Health Library of the National Health Council, 450 7th Avenue, New York. \$2.50 a year.

## HEALTH EDUCATION

The following references appear in *Library Index*:

Lokrantz, Sven, M.D. Vacation health teaching. *American childhood* (Springfield, Mass.) 18:15-17, June, 1933.

Rogers, J. F., M.D. Alcohol. How changing liquor laws revive a teaching problem. *School life* (Washington, D. C.) 18:163, May, 1933.

## BOOKS RECEIVED

PSYCHO-ANALYSIS TODAY: ITS SCOPE AND FUNCTION. Edited by Sandor Lorand. New York: Covici-Friede, 1933. 370 pp. Price, \$4.25.

OBSTETRICS FOR NURSES. 10th Ed. By Joseph B. DeLee. Philadelphia: Saunders, 1933. 665 pp. Price, \$2.75.

NERVOUS AND MENTAL DISEASES FOR NURSES. 2d Ed. By Irving J. Sands. Philadelphia: Saunders, 1933. 281 pp. Price, \$1.75.

THE NEW DENTISTRY. A PHASE OF PREVENTIVE MEDICINE. Six Lowell Lectures by Leroy Matthew Simpson Miner. Cambridge: Harvard University Press, 1933. 219 pp. Price, \$2.00.

THE HEALTH SCHOOL ON WHEELS. By J. Mace Andress and I. H. Goldberger. Boston: Ginn, 1933. 399 pp. Price, \$.76.

THE NUTRITIVE PROPERTIES OF MILK IN RELATION TO PASTEURIZATION. A REVIEW OF EXISTING KNOWLEDGE. By J. D. Stirling and J. H. Blackwood. Kirkhill, Ayr, Scotland: Hannah Dairy Research Institute, 1933. 80 pp. Price, \$1.00.

STOP THAT SMOKE! By Henry Obermeyer. New York: Harper, 1933. 289 pp. Price, \$2.50.

IDEAL MARRIAGE: ITS PHYSIOLOGY AND TECHNIQUE. 7th Ed. By Th. H. Van de Velde. New York: Covici-Friede, 1933. 323 pp. Price, \$7.50.

CHRONIC ILLNESS IN NEW YORK CITY. By Mary C. Jarrett. New York: Columbia University Press, 1933. 636 pp. Two volumes, \$5.00.

THE APPROACH TO THE PARENT: A STUDY IN SOCIAL TREATMENT. By Esther Heath. New York: Commonwealth Fund, 1933. 163 pp. Price, \$1.25.

THE THERAPEUTIC AGENTS OF THE QUINOLINE GROUP. By W. F. von Oettingen. New York: Chemical Catalog Co., 1933. 301 pp. Price, \$6.00.

CANCER AND OTHER CHRONIC DISEASES IN MASSACHUSETTS. By George H. Bigelow and Herbert L. Lombard. New York: Houghton Mifflin, 1933. 355 pp. Price, \$4.00.

## BOOKS AND REPORTS

Peace of Mind and Body—By *William S. Walsh, M.D.* New York: Dutton, 1933. 243 pp. Price, \$2.50.

Everyone desires peace of mind and body but its availability is determined mainly by the ability of individuals to live intelligently. Back of this is the necessity of health as a prerequisite to normal adjustment. All rules and regulations, plans and schemes for teaching people to manipulate their lives so that they may attain rational living appears dubitable in the light of the basic tendencies of mankind to magnify difficulties, to utilize leisure time without great thought and to stultify an individuality in the avid interest of attaining economic security.

Dr. Walsh suggests what is reasonable: the elimination of the disturbing environmental factors so that one may realize the joys of tranquillity. The attainment of such a state involves both physical and mental hygiene in the interest of physical vigor and vitality, personal satisfaction, useful and pleasant employment of all hours, whether in work, play or rest. The attainment of social adequacy assumes an important place in this scheme of organismic equilibrium.

Dr. Walsh is not a doctrinaire but his advice is based upon a number of factors which are beyond individual control. His approach involves a capacity for self-direction and intelligent self-guidance, which are not readily attainable. His mode of life calls for substantial courage, a splendid honesty with one's self in addition to a specialized knowledge of the essentials and art of living, which actually is the possession of comparatively few of our active population. To learn how to grow up, how to live in the home and

on the job, how to withstand pressures and how to enjoy the release into freedoms, how to measure one's own satisfactions, in terms of a practical standard of equability and equanimity is in itself a threat to the peace of mind unless the innate organization of the individual is equal to the task.

Peace of mind and body, after all, are by-products of living. General rules are difficult to follow. Everyone has personal problems to solve, out of which varying degrees of peace are attained. Sometimes life is merely an armed armistice, at other times it is retreat; and yet there is some peace to be found in each of these though perhaps to the onlooker it merely represents strife and discomfort. The goal of peace—pleasurable and persistent—warrants a battle.

Dr. Walsh has presented a non-technical, popular volume dealing with psychological values which are bound up in living, learning, and loving, intelligently, without losing emotional equilibrium.

IRA S. WILE

Child Care Today—By *Bela Schick, M.D., and William Rosenson, M.D.* New York: Greenberg, 1932. 320 pp. Price, \$2.50.

This is a well-written book by men of recognized ability, the facts being so simply stated that the subject matter is easily comprehended by the layman. It was felt by the authors that there was a distinct need for a book that would assist parents in laying the foundation for sound physical and mental health in infancy and childhood.

*Part I* deals with the important phases of prenatal care and influences.

*Part II* considers the details of general hygiene and feeding of infants.

There is an interesting chapter on "Guiding the Infant in His Intellectual and Emotional Growth."

*Part III* covers the preschool child—the child between 2 and 6 years of age—which has come to be called the "neglected age." The general care and hygiene of this child is well presented, with the newer ideas of nutrition and diet. There is a most important consideration of child guidance and behavior problems.

*Part IV* emphasizes disorders and diseases of childhood, especially from the preventive standpoint. Recognized procedures of prevention are fully considered and evaluated.

ELDRED V. THIEHOFF

**The New Dentistry: A Phase of Preventive Medicine (Six Lowell Lectures)**—By Leroy Matthew Simpson Miner, D.M.D., M.D. Cambridge: Harvard University Press, 1933. 219 pp. Price, \$2.00.

We would pass this book without review, except that it comes from the Harvard University Press, from which we are entitled to receive correct information, and it is written by the Dean of the Dental School of that University.

The lectures of which it is composed were delivered to the laity, and the book is intended for nonprofessional reading. It contains some useful information. We would, however, recommend both to the author and the editor of the Harvard University Press the use of a good medical dictionary, and a study of history, and would refer them particularly to Bulletin 19 of the Carnegie Foundation for the Advancement of Teaching, to the Dictionary of American Medical Biography by Kelly and Barrage, on Crawford W. Long, and the Index Catalogue of the Surgeon General's Library, Third Series, Vol. VII, page 764, Long (Crawford Williamson).

MAZÛCK P. RAVENEL, M.D.

**Amateur Nurse**—By Mary Wright Wheeler, R.N. Indianapolis: Bobbs-Merrill, 1933. 234 pp. Price, \$2.00.

This book will undoubtedly find a place among wives and mothers in average homes who sooner or later may be called upon to be amateur nurses. The style is informal and gay, sometimes even saucy. It is easy reading for laymen, because it is free of heavy scientific terms, and written in language for the "man in the street."

Obviously the book was not written by a public health nurse, because there is a little too much emphasis put on home medication, even though the doctor is mentioned in nearly every other paragraph. Argyrol for a baby's inflamed eyes and to be swabbed on a sore throat, and "perles" of amyl nitrite for angina pectoris and asthma are illustrations of this.

Not all physicians will agree that the only place for the patient ill with pneumonia is the hospital. This disease does call for good care, but many cases have recovered at home with nursing furnished by members of one's own family, a practical nurse, a visiting nurse, or a private duty registered nurse. Some authorities feel that babies and very young children recover more rapidly and surely at home than in the hospital separated from parents and family.

The chapter on nursing care of pre-natal patients is particularly good, but those that shine above all others are "The Amateur Nurse Lovingly Tends an Aged Invalid," "Tempting an Ailing Appetite," and "Good Invalids—Makings of and Encouragement to Be." Every trained as well as every amateur nurse should read these chapters. The author certainly knows her mental hygiene when dealing with elderly people. She could even give Dorothy Dix some pointers on how to solve the mother-in-law problem.

EVA F. MACDOUGALL

**The Examination of Waters and Water Supplies**—By *John Clough Tresh, M.D., John Foster Beale, and Ernest Victor Suckling.* (4th ed.) Philadelphia: Blakiston, 1933. 824 pp., 61 ill. Price, \$9.00.

The authors have tried to maintain the general plan of the first edition. With the greater utilization of sources of water, more emphasis has been placed upon the quality and purification of river waters. The most recent methods of sterilization of water by the use of minute amounts of silver and chloramine, for example, have been included. Sources of water, the mineral content, and the effect upon health of the various inorganic constituents are considered. Methods for the determination of the numerous elements in water are described and the properties of water which make it suitable or unfit for particular purposes are given.

Part IV is devoted to the interpretation of the results of physical, biological and chemical examinations. The lead solvent action of various waters and possible remedies are discussed, although this is of minor importance from the standpoint of readers in this country, where lead is only sparingly used as a conduit for drinking water.

A reasonable portion of the book is concerned with the bacteriological examination of water, the survival of bacteriological types, the enumeration, the use of different bacteriological indicators of sewage pollution, and the isolation and identification of pathogenic species. The last section deals with the purification and treatment of waters. Unfortunately, few data are given which might indicate the relative efficiency of different purification methods. A chapter on the treatment of water for the removal of undesirable odors and tastes will be of interest to many. This includes the use of activated carbon. The fundamentals of

swimming pool control are given in the final chapter. This is followed by 36 plates illustrating the microscopic organisms and debris found in waters derived from a variety of sources, and by an appendix which contains formulae for use in the chemical and bacteriological examinations of water and sewage.

The printing and make-up are excellent. NEWELL R. ZIEGLER

**The Medical Secretary**—By *Minnie Genevieve Morse.* New York: Macmillan, 1933. 162 pp. Price, \$1.50.

As one, who like the woman in the Bible, has suffered many things from many physicians, in the literary sense at least, the reviewer is tempted to indulge in enthusiasm over this little book, and would do so if it could be placed in the hands of all physicians as well as their secretaries, and they be made, in the words of the Episcopal Prayer Book, to "read, mark, learn, and inwardly digest" it.

The author writes from her experience of 10 years as a medical secretary, and 9 as a member of the executive staff of a general hospital, 3 of which included the training of young women for hospital record-room work. It is evident that she has made good use of her experience.

Short as the book is, it covers practically every point necessary, beginning with qualifications and personality desirable for secretarial work. She even considers such points as answering the telephone, a point the importance of which is probably not appreciated by many. Good advice concerning the handling of patients, and of correspondence, proper forms and style, etc., are given. Next comes advice on medical research, card indexing, abstracting of medical articles, and preparing of medical manuscripts, bibliographies, etc. Two pages are given to the signs used in correcting proof. A very useful section of the book, some 62 pages, is

devoted to medical terminology, which is remarkably complete for the space given, and correct.

There are only two things which we feel inclined to criticise: the definition of the prefix "meta," and the use of the word "receptionist," meaning the person who receives in the office. With such a rich language as English, there is hardly any excuse for coining such a terrible word.

The book is well printed and put together, and can be heartily recommended.

MAZÛCK P. RAVENEL

**Die soziale Bedeutung und Beurteilung der Kreislauferkrankungen**

—By Dr. Franz Grünbaum. Leipzig: Georg Thieme, 1933. 128 pp., 20 figs. in text. Price, M. 4.50.

This is No. 21 in the series of booklets on Labor and Health, a social-medical series from the Labor Ministry of Germany. This field of social-medical service has lagged behind others, notably those of tuberculosis, and of late of venereal diseases, infants' diseases, cripples, and cancer. The growth of information as to the significance, frequency, and the cause of diseases of the circulatory system has brought this field into prominence, especially in the United States. Mortality records in Germany from 1904 to 1928 show a sharp decline in total mortality and especially in that due to tuberculosis. On the other hand, deaths from heart disease have shown a statistical increase of about 60 per cent, rising most rapidly in recent years. A similar increase occurs in Massachusetts. Heart disease is, as a rule, the leading cause of death, being a little greater in most age classes in females than in males, and attaining its maximum incidence in sixty to seventy years, namely of 26.91 in males and 27.45 per cent in females in Prussia in 1928. There are suggestions that the increase in recent years is associated

somewhat with the growth of urban life, but the statistical data are as yet inadequate to make this certain. Organic heart diseases are clearly associated with rheumatic conditions in decreasing ratios in persons from ten to fifty years of age and with the incidence of infectious diseases, in increasing ratios, from forty to eighty years.

The social significance of this group of diseases is great, since they profoundly affect the amount and kind of labor that the persons thus afflicted can perform. They constitute a large element in the burden of invalidism which the family and society must carry.

C. A. KOFOID

**Annual Report of the Bureau of Sanitary Engineering, Maryland State Dept. of Health, 1932.**

It is interesting to report that the lowest typhoid fever death rate experienced in the history of the State of Maryland occurred this year when a death rate of 3 per 100,000 was reached, with virtually none of this attributable to public water supplies. \$7,071,000 were expended for water supply and sewerage facilities in the state or \$1,179,000 less than in 1931. Permits were issued for 143 of the 155 camps and for 8 of the 20 swimming pools inspected. Full-time sanitary engineering in Anne Arundel County permitted regular monthly sampling of all milk sold; special sampling from individual cows suspected of mastitis, garget and inflamed udders; careful investigations at 45 dairy farms, and inspections of all schools in the county. Improvements have been made at many of the dairies and schools.

Two epidemics of importance received special study. A para-typhoid A fever outbreak in a mining community at Vindex developed serious proportions in the late summer and, during a picnic at Fairview Beach, a severe epidemic of intestinal disturbance occurred. By

means of the salt test it was demonstrated that a suspected privy was the source of contamination of a semi-private dug well used as a source of water supply by the community. The well was inadequately protected against surface and underground drainage. A dug well furnishing drinking water for the public at Fairview Beach was not so definitely established as the cause of this epidemic, but it was so constructed as to be exposed to pollution from surface wash and probably shallow infiltration.

Developments in swimming pool sanitation and control consisted essentially in prescribing for the control of ringworm or athlete's foot. Cleansing of equipment with calcium hypochlorite and foot baths containing either a 2 per cent solution of calcium hypochlorite or a 15 per cent solution of sodium thiosulphate has been suggested, although the dechlorinating possibilities of the latter have made its use somewhat undesirable.

Early in the year, a report was prepared on the operation of sewage treatment plants at state institutions, based upon inspections and analyses of samples collected during 1930 and 1931.

The industrial waste that offered the important problem of the year was that from milk plants. This industry, without efficient regulation and control of supply and demand, was forced in several instances to discharge tons of skimmed milk containing valuable food and fertilizer elements into sewage treatment works and streams.

The recommendations of the Chief Engineer were accepted by Baltimore City in its refuse collection and disposal problem, and resulted in the construction of a new 600 ton incinerator which is to become city property at the expiration of the 10-year contract, and will save the city \$324,400 annually.

The Water Resources Commission

completed its survey and recommends the creation of a permanent Water Resources Commission of Maryland.

A. W. BLOHM

**Social Work and Educational Problems in Germany—Series I, of 6 numbers of 10 mimeographed pages each, on present conditions in Germany, by Dr. Ruth Weiland, Manager of the Deutsche Zentrale fuer freie Jugendwohlfahrt (Central Organization for Youth Welfare), Berlin, Germany. \$3.00 U. S. currency. Schwarzburg Allee 3, Berlin-Charlottenburg, Germany.**

This series of informative monographs will present to the English and American readers material difficult to obtain except from those actually engaged in active welfare work in Germany. The author has been in such work for a number of years and is conversant with the current trends in the social, economic and cultural life in that country. Her practical experience as an executive in the central organization for the youth welfare movement in Germany qualifies her in presenting the results of her observations. These papers discuss the following subjects:

1. Federal and State Legislation in the Field of Child Welfare
2. Responsibility of Local Authorities for Needy Individuals
3. Importance of Sickness, Invalid and Old Age Insurance for the Economically Weak
4. Welfare in Actual Practice for the Unemployed
5. Development and Extent of Social Welfare in Country Districts
6. Effects of Unemployment on Delinquency of Children and Young People

The first number of this series appears in May and will be followed soon by the others. All those who wish to gain a broad view of what is happening in the social welfare field in Germany will do well to read this series.

RICHARD A. BOLT



**American Red Cross First Aid Text-Book**—*Philadelphia: Blakiston, 1933. 237 pp., 110 illustrations. Price, paper, \$.60, cloth, \$1.00.*

This book is to be used by the teacher for the instruction of First Aid Classes, and it would be hard to conceive of a text that is more complete or more compact. There is not a superfluous word in it. Everything from corns to hiccoughs and hives is discussed from the first aid point of view.

Plenty of space is given to the 3 chief causes of accidents in the home; burns, falls and poisons. An innovation is rules for the prevention of these accidents given along with their first aid treatment.

The illustrations are abundant, up to date and excellent. The book deserves to be the leading authority in the field for its purpose—to guide instructors of First Aid Classes. It is also undoubtedly the best general reference book on first aid that exists.

EVA F. MACDOUGALL

**Official Proceedings of the Thirty-Eighth Annual Convention of the American Society of Municipal Engineers**—*St. Louis: Printed by the Society, 1933. 685 pp. Price, \$7.50.*

This volume of papers and discussions by well known authorities contains 3 chapters of particular interest from the public health standpoint, for they have to do with water supplies, refuse disposal, street cleaning, and sewage disposal. Other chapters contain matter of more or less health interest.

The chapter on water-works is a committee report on recent progress in producing pure water. Most municipal supplies are safe most of the time, and a large percentage of the typhoid which occurs could be prevented if more attention were given to the protection of the water after it has come into the

control of the company or municipality.

Cross connection with polluted water, leakage of well casings and conduits, and failure to chlorinate continuously are sources of danger which are now receiving more attention than formerly.

All recent filtration plants have been of the rapid, or mechanical, type. The only large cities on the Great Lakes without filters are Chicago and Milwaukee, and both are considering purification.

The removal of tastes and odors from water by activated carbon is being practised at over 400 municipal plants, at an average cost of 1 cent per 10,000 gallons.

There are 175 municipal water softening plants in the United States, of which about one-third treat well waters. Usually, the saving in soap justifies the cost.

Refuse disposal and street cleaning have recently been the subject of sharp budgetary cuts, but in spite of this there has been no great reduction in the work done. The savings have been made chiefly by wage reductions, stagger employment, speeding up, and increased mechanization.

Incineration, hog feeding and dumping are the usual methods employed for disposal of garbage. In the year ended June 30, 1932, there were 17 incinerators of from 50 to 600 tons daily capacity built in the United States. A number of incinerators were erected for the screenings produced by sewage disposal plants.

Closed vehicles with low-loading sides have made their appearance in a number of American cities for collecting refuse, and a number of designs have recently come upon the market; but aside from this no special advance in public cleansing methods or equipment is noted.

An excellent paper by Major I. S. Osborn, with discussions by a number of qualified persons, deals with the tech-

nical aspects of incinerator design. Others were on recent developments in sewerage and sewage disposal, by Albert P. Learned; on construction costs of sewage treatment works, by Samuel A. Greeley; on operation of sewage treatment works, by Harry A. Beaumont; and on modern methods of dewatering sludge, by Edmund B. Besseilievre.

These papers were read January 16-18, and the *Proceedings* published on April 1, an example of prompt, enterprising executive ability which many other societies might well imitate. Its early appearance adds immensely to the value of the volume.

GEORGE A. SOPER

**Towards Mental Health: The Schizophrenic Problem—By Chas. Macfie Campbell.** Cambridge: Harvard University Press, 1933. 110 pp. Price, \$1.25.

Dr. Campbell is a psychiatrist of wide experience and broad horizons. He offers a wealth of material, succinctly discussed, pointedly presented in a manner that should stimulate all readers who are interested in public health.

There is a clear demonstration of the difference between the fields of physical and mental hygiene. The larger measure of etiological certainty that obtains in promoting immunity from diphtheria sharply contrasts with the poorly formulated factors operating in the field of mental disorder.

Workers in public health must learn to perceive the significance of the reaction to living in its influence upon human happiness. Functional qualities of life are bound up in the complex problems of mental hygiene rather than the quantitative factors of vitality, which form the major phases of public health service.

Dr. Campbell selected the schizophrenic field rather than the subject of dementia praecox, thus indicating his

appreciation of the limitations of nomenclature and the uncertainty of much of our present day symptomatology as the basis of final diagnosis. His "schizophrenic territory" especially concerns public health authorities, because those living therein are most likely to become social liabilities.

Forty-three cases are discussed in terms of their reaction types. His exposition centers upon 3 main phases which recur most frequently in clinical histories: (1) the question of an adjustment in terms of the sex instinct and the memories of past sexual experience; (2) the problem of parent-sibling relationships, (3) the question of attaining an individual personal value in social groups.

The third chapter discusses heredity and environment and places the main emphasis upon education and environmental factors, because of the very limitations of hereditary material. Just as in public health work there was need for social coöperation and support in order to prevent tuberculosis, so the prevention of mental disorders calls for the education of individuals, families and communities.

Rigid community standards and demands for conformities tend to lessen mental stability and need curbing. Educational values enable each person to accept his real limitations and to function in terms of his complete organic potentials.

This is a presentation of the three Adolph Gehrmann lectures in hygiene given at the University of Illinois College of Medicine in 1932. The issues discussed, the cases presented and the viewpoints expressed are of paramount importance and merit reading and consideration by public health workers who have not yet appreciated the significance of individual adaptation as a factor in public achievement and communal welfare.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Diabetes in Married Women and "Maiden Ladies"**—Among New Yorkers over 45 years, the diabetes death rate in single women is no higher than in bachelors, but the rate in married and widowed women is more than double that of married men. Is this due to the fact that married women are fatter than single, or because they have borne children? Other statisticians are invited to analyze their records to find out if the number of pregnancies affects the rate.

ANON. Diabetes in Older Adults by Civil Condition and Sex. *Quart. Bull. (New York City Dept. of Health)*, 1, 2:29 (June), 1933.

**General Protection from Specific Immunization**—Here are significant findings:

"1. . . . exercise of the defense mechanism by inoculation with heterologous antigens increases the resistance . . . to the subsequent action of various infectious agents and toxin substances.

2. . . . "this increased resistance . . . is the result of a mobilization, strengthening, and training of the defense mechanism.

3. . . . "it may be sufficient to modify the cause of subsequent infections . . . such as poliomyelitis or post-vaccinal encephalitis.

4. . . . "specific immunization . . . may be valuable in increasing resistance to various subsequent infections."

ARMSTRONG, C., and HARRISON, W. T. Heterologous Experience (Immunization) as a Factor in Resistance to Disease. *Pub. Health Rep.* 48, 22:597 (June 2), 1933.

**Phage Proves a Weak Reed in Water Purification**—Reasons why bacteriophage cannot be expected to be a useful agent in the purification of

polluted waters are briefly set forth. The studies reviewed indicate that many research workers have been led to believe in the sanitary value of the phage.

BEARD, P. J. Rôle of Bacteriophage in Natural Purification. *J. Infect. Dis.* 52, 3:420 (May-June), 1933.

**Looking at Mortality Rates**—There is no evidence in the Massachusetts death rates, conclude the authors, that the physically unfit are coddled in childhood, for the mortality rates in middle life, which should increase if we were rearing a race of weaklings, do in fact show a gratifying decline.

BIGELOW, G. H., and HAMBLIN, A. D. What Are Death Rates in Massachusetts Doing? *New Eng. J. Med.* 208, 25:1313 (June 22), 1933.

**Blood Cultures from Rheumatic Fever**—This is the brief and disturbing conclusion to a very long and involved dissertation on rheumatic fever: "Diplostreptococci (alpha type) and pleomorphic bacilli may be recovered repeatedly from the blood of patients (and others). . . . These organisms apparently represent stages in the life cycle of the same organism. A specific etiologic relationship between these organisms and rheumatic fever is questioned."

CALLOW, B. R. Bacteriologic Investigation of the Blood of Rheumatic Fever. *J. Infect. Dis.* 52, 3:279 (May-June), 1933.

**Why We Fail to Detect Tuberculosis**—Principal reasons for failure to diagnose tuberculosis early are that symptoms are absent and the doctor is not consulted. When he is, too much dependence is placed upon physi-

cal examination. History of contact is of some slight diagnostic value in children but not in adults. A roentgenogram is the only way to avoid mistakes. A tuberculin test should be given to all children and some adults.

CHADWICK, H. D. Early Detection of Pulmonary Tuberculosis. *New York State J. Med.* 203, 22:1143 (June 1), 1933.

**Diphtheria Immunization and Tuberculosis**—Schick positive children suffering from tuberculosis were immunized successfully against diphtheria with three injections of toxoid and without troublesome reactions.

PARISH, H. J. Immunization of Tuberculous Children Against Diphtheria with Formol Toxoid. *Lancet* 224, 5725:1063 (May 20), 1933.

**Disposing of Sewage Sludge**—The newer developments in the 57 varieties of sludge treatment found the country over are summarized in an inclusive discussion of this most difficult phase of sewage disposal. The authors conclude that sludge handling has not kept pace with other advances in sewage treatment.

RUDOLFS, W., and CLEARY, E. J. Sludge Disposal and Future Trends. *Sewage Works J.* 5, 3:409 (May), 1933.

**Nursing Service and Relief**—How the New York State Relief agency supplied nursing care for dependent families, utilizing the services of nurses who themselves needed aid, furnishes an important chapter in the story of better health administration.

SHEAHAN, M. W. An Experiment in Double Relief. *Pub. Health Nurs.* 25, 7:378 (July), 1933.

**Successful Results from a Scarlet Fever Toxoid**—A method is described for the concentration of scarlatinal streptococcus toxin to increase the content fourfold without increasing total nitrogen. Detoxification methods are given. Three doses administered to

children under 15 years produced only mild symptoms and induced a Dick negative condition in 87 per cent of the cases.

VELDEE, M. V. The Preparation of a Scarlet Fever Streptococcus Toxoid and Its Use in Active Immunization. *Canad. Pub. H. J.* 24, 6:255 (June), 1933.

**Industrial Hygienists, Take Note**—Methylene blue, an antidote for cyanide, is not a satisfactory one for carbon monoxide. Evidence is presented showing that its use may induce fatalities that might otherwise not occur.

HAGGARD, H. W., and GREENBURG, L. A. Methylene Blue, a Synergist, Not an Antidote, for Carbon Monoxide. *J.A.M.A.* 100, 25:2091 (June 24), 1933.

**Contaminated Eclairs Poison 150 Women**—Golden staphylococcus colonies isolated from eclair filler were cultured and the filtrate fed to volunteers. Symptoms of food poisoning developed quickly to prove that the eclairs were the culprits causing a large outbreak of digestive disorders. The volunteers who took the filtrate ought to be given a niche in the hall of public health fame. How the virulent staphylococcus got into the filler and from whence it came were not disclosed.

McBURNIEY, R. Food Poisoning Due to Staphylococci. *J.A.M.A.* 100, 25:1999 (June 24), 1933.

**Can Venereal Disease Cases Really Be Followed?**—Services of a social worker were offered to a group of practicing physicians for the follow-up of delinquent venereal patients and sources of infection. What the outcome was, and the philosophic discussion of the possibilities of this line of attack, will interest all health officials who have the fortitude to look this problem in the eye.

NELSON, N. A. The Follow-Up of Gonorrhea and Syphilis in Private Practice. *New Eng. J. Med.* 203, 22:1153 (June 1), 1933.

## NEWS FROM THE FIELD



DR. CHARLES PORTER.

PRESIDENT OF THE SOCIETY OF MEDICAL  
OFFICERS OF HEALTH

AT a general meeting of the Society of Medical Officers of Health, held recently, Dr. Charles Porter, M.D., C.M., B.Sc. (P.H.) Edin., M.R.C.P. Edin., Barrister-at-Law, the well known Medical Officer of Health of the Metropolitan Borough of St. Marylebone, London, was unanimously elected President of the Society for the session 1933-34, and will take office on October 1st next. Dr. Porter, who is Deputy Chairman of the Council of the Royal Sanitary Institute, of England, is widely known for his active and whole-hearted support in connection with furthering the efforts of a number of societies whose aim and object it is to continue to raise the standard of the

health of the community. He is author and part-author of a number of works which are regarded as standard authorities upon the subjects dealt with. He is an ideal chairman of meetings and, socially, his personality has made him a host of friends, who will congratulate him upon his fresh honor. To these congratulations we add our own.

### FINANCING PUBLIC IMPROVEMENTS

THE Industrial Recovery Act, passed by Congress June 13, 1933 (Act H. R. 5755), includes an appropriation of \$3,300,000,000 to finance public improvements. It is stated that under the provisions of the Act there is a possibility for local communities to secure necessary public improvements, such as sanitary water system, sewage systems, etc. This would indicate the possibility of securing necessary public health improvements under the provisions of the Public Works Title of the Industrial Recovery Act.

### IMMUNIZATION PROGRAM FOR DENVER

RECOMMENDATIONS framed by the committee on relations with public schools of the Medical Society of the City and County of Denver have been adopted by welfare agencies as the basis of a program of immunization for the city and county. Provision was made for vaccination of all new-born infants occupying free beds at the Denver General and Colorado General hospitals and immunizations against both smallpox and diphtheria for all infants admitted to welfare stations. Free immunization of school children in poor districts and of poor children in other districts if certified by the school

nurse was recommended. Parents are to be urged to have their children immunized by the family physician.

The committee also recommended that the society sponsor a campaign of education among physicians to prepare them for the work of immunization, including demonstrations of the technic of giving toxoid, the Schick test, and smallpox vaccination. In addition, literature on immunization, prepared jointly by the society, the city health department and the school health authorities, will be distributed among parents' organizations, especially if a case of smallpox or diphtheria appears in the schools.

#### CANADIAN PUBLIC HEALTH MEETING

THE 22nd Annual Meeting of the Canadian Public Health Association was held in St. John, N. B., June 19, 20, and 21. There were two General Sessions, two meetings of the Vital Statistics section, and one each of the sections on Public Health Nursing and Laboratory. All were well attended.

Dr. John A. Ferrell, President of the American Public Health Association, attended the meeting and extended the greetings of the A.P.H.A.

Dr. William Warwick, Deputy Minister of Health of New Brunswick, is President of the Canadian Public Health Association for 1933, and Dr. Alphonse Lessard, Provincial Health Officer of the Province of Quebec, was named as President-Elect, to serve through the year 1934.

#### MISSOURI STATE BOARD OF HEALTH ABOLISHED

THE State Department of Health of Missouri has been created to supplant the old state board of health, through the enactment of recent legislation. The position of secretary of the board has been abolished and provisions have been made for the appoint-

ment of a commissioner of health, to whom have been transferred all rights, powers and duties heretofore conferred on the secretary. Emmett P. North, of St. Louis, is president.

#### CELEBRATION OF BIRTH OF BERNARDINO RAMAZZINI

DR. LUIGI DEVOTO, President of the Permanent International Commission on Labor Medicine, announces that the 3rd Centennial Anniversary of the birth of Bernardino Ramazzini will be celebrated on October 4, 1933, at the Clinica del Lavoro, Milan, Italy. Two editions of Ramazzini's "De Morbis Artificum" will be published for the occasion, one in Italian and one in French. Appropriate auxiliary features, exhibits, etc., will accompany. Those who may be able to attend should address Dr. Emery R. Hayhurst, 1108 State Office Building, Columbus, Ohio (representing the United States on the Commission).

#### INDIANA STATE HEALTH DEPARTMENT NEWS

DR. V. K. HARVEY is the new head of the Indiana State Department, succeeding Dr. John H. Hare. Dr. Harvey was formerly with the Department for two years as Epidemiologist, after which time he was given leave of absence to take a year in Johns Hopkins.

#### BIRTH CONTROL REVIEW SUSPENDS PUBLICATION

AFTER sixteen years, the *Birth Control Review*, published by the American Birth Control League, Inc., of New York, will be discontinued, with the July issue.

In its place, the League will issue a monthly news bulletin, which will start publication in October, and retain the name *Birth Control Review*.

#### CLOSING DATE FOR SUBMISSION OF FELLOWSHIP APPLICATIONS

ALL members desirous of applying for Fellowship are hereby advised that their applications must be transmitted to the Executive Office not later than August 10, if they are to be finally acted upon by the Governing Council at the Indianapolis Annual Meeting.

#### ORGANIZATIONS MEETING WITH US AT INDIANAPOLIS

The organizations meeting at Indianapolis with the American Public Health Association are scheduled as follows:

- October 7-9, Conference of State Sanitary Engineers.
- October 7-9, Public Health Education Institute (Claypool Hotel).
- October 9-12, International Association of Medical Health Officers.
- October 9-12, American Association of School Physicians (Severin Hotel).
- October 12-14, American Social Hygiene Association.
- October 12, Central States Sewage Works Association.
- October 12-14, International Association of Dairy and Milk Inspectors (Claypool Hotel).
- October 12-14, Indiana State Nurses' Association (Severin Hotel).
- October 12-14, Board of Directors of the Midwest Division, American Nurses' Association (Severin Hotel).

#### PERSONALS

DR. JAMES V. MAY, member A.P.H.A., was elected recently as President of the New England Society of Psychiatry.

EDWARD L. MILOSLAVICH, M.D., Fellow and applicant for Life Membership in the A.P.H.A., has accepted a position as Professor of Legal Medicine and Director of the Medico-

Legal Institute at the Royal University, Zagreb, Yugoslavia.

DR. OSCAR D. LUDWIG, member A.P.H.A., has been appointed Health Officer of Marion County, Ind., to fill the unexpired term of the late Dr. Frederick W. Mayer, of Indianapolis.

DR. ELMER T. MCGAUGH, of Jefferson City, Mo., has been appointed to serve as Missouri State Health Commissioner for a term of 4 years, succeeding Dr. James Stewart, who also acted as secretary.

DR. BURTON K. KILBOURNE, of Fargo, N. Dak., was elected president at the annual meeting of the official organization for North Dakota Health Officers, at Fargo recently. Dr. Ernst G. Sasse, of Lidgerwood, also member of the A.P.H.A., was elected vice-president; and Dr. Arthur A. Whittemore, of Bismarck, was elected secretary.

DRS. JOHN S. MCCELVEY, of Temple, Tex., and SAMUEL A. WOODWARD, of Fort Worth, have been appointed to the Texas State Board of Health, it is reported. Dr. John R. Mahone, of Austin, was recently named Health Officer of Cameron County, to succeed Dr. William E. Spivey, of San Benito.

DR. JOHN A. AMYOT, member A.P.H.A., for 14 years Deputy Minister of National Health of Canada, and, recently of Pensions and National Health, has retired because of ill health. From 1900 to 1919 he was associated with the Provincial Department of Health of Ontario and also with the public health teaching staff at the University of Toronto.

DR. HAVEN EMERSON, of New York, Life Member and President-Elect of the A.P.H.A., addressed the graduating class of the Woman's Medical College of Pennsylvania at the 81st annual commencement, June 7, on distribution of medical care.

DR. ALBERT FRITSCHÉ, of New Ulm, Minn., has been appointed a member of the Minnesota State Board of Medical Examiners, succeeding Dr. George B. Weiser.

DR. EDWIN R. VANDERSLICE, member A.P.H.A., has been appointed to succeed Dr. S. Rowland Hill as Health Officer of Lansing, Mich., who held the position for 12 years.

DR. SAMUEL R. MCKELVEY, of Denver, member A.P.H.A., has been reelected as secretary of the Colorado State Board of Health. Dr. McKelvey will become executive officer of the division of public health created as a part of the Colorado executive department in a reorganization of the state government by the last legislature. The new division combines all the functions of the state board of health, the meat and slaughter plant inspectors, and the state chemist under Dr. McKelvey's supervision, subject to control by the state board of health.

## CONFERENCES

July 29–August 4, World Federation of Education Associations, Dublin.

September, 1933, European Reunion on Mental Hygiene and Prevention, Rome, Italy.

September 5–7, Seventh Annual Conference of the Pennsylvania Sewage Works Association, State College, Pa.

September 27–28, Second European Reunion on Mental Hygiene, Rome.

October 7–9, Public Health Education Institute.

October 7–9, Conference of State Sanitary Engineers, Indianapolis, Ind.

October 9–12, Sixty-second Annual Meeting of the American Public Health Association, Indianapolis, Ind.

October 9–12, American Association of School Physicians, Indianapolis, Ind.

October 9–12, Conference of State Laboratory Directors, Indianapolis, Ind.

October 9–12, International Society of Medical Health Officers, Indianapolis, Ind.

October 9–12, Association of Women in Public Health, Indianapolis, Ind.

October 12, Central States Sewage Works Operators Association, Indianapolis, Ind.

October 12, Indiana State Nurses' Association, Indianapolis, Ind.

October 12, Indiana League of Nursing Education, Indianapolis, Ind.

October 12–14, American Social Hygiene Association, Indianapolis, Ind.

October 12–14, International Association of Dairy and Milk Inspectors, Indianapolis, Ind.

November, 7th American Scientific Congress, Mexico City.

February 5–9, 1934, Third International Heating and Ventilating Exposition, Grand Central Palace, New York, N. Y.

March 29, 30, 1934, Annual Meeting of the American Association of Pathologists and Bacteriologists, Toronto, Ont., Canada.

Spring, 1934, Statistical Conference, International Statistical Institute, London, England.

1935, International Congress on Mental Hygiene, Paris.

### Do You Want A Dictionary?

The A. P. H. A. Book Service offers for sale a new copy of Webster's New International Dictionary of the English Language, at a special discount of 25 per cent. 2700 pp., 6000 illustrations, published 1931 (G. & C. Merriam Co., Springfield, Mass.); list price \$17.00, Book Service price \$12.75.

Order from

American Public Health Association  
450 Seventh Avenue, New York, N. Y.



# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

September, 1933

Number 9

## The Sanitary Control over the Production and Handling of Shellfish on the Pacific Coast\*

CARL E. GREEN

*Sanitary Engineer, State Department of Health, Portland, Ore.*

WITH the appearance of numerous and widespread cases of typhoid fever in the eastern part of the United States in the latter part of 1924 and in the early part of 1925, studies were made by health authorities to determine the sources of the infection. After considerable study the investigators concluded that oysters were responsible. To protect the public health and to restore public confidence in the shellfish industry, a committee, known as the Committee on the Sanitary Control of the Shellfish Industry in the United States, was formed on February 19, 1925, to study the problem. Representatives of the shellfish industry as well as federal, state and municipal health officials were included in the personnel. A report by this committee was made to the Surgeon General of the U. S. Public Health Service in 1925, in which were recommended minimum requirements for control of the shellfish

industry. Two supplementary reports have since been issued. Speaking generally, it is these minimum requirements which are followed by the U. S. Public Health Service and the various state agencies engaged in the sanitary control of shellfish.

On the Pacific Coast Washington led the way in June, 1927, when the State Board of Health adopted rules and regulations for the sanitary control of shellfish. Oregon and California followed in January, 1932, and Washington amended its regulations in January, 1933. The requirements of the three Pacific Coast states are practically identical and in general conform with the minimum requirements of the U. S. Public Health Service.

Though the term shellfish as used in various state regulations includes all varieties of clams, mussels and scallops as well as oysters, this paper will be limited to a discussion of the sanitary control of oysters. From a public health point of view oysters are the most important of the shellfish group for the following reasons:

---

\* Read before the Session on Sanitation, Water, Food and Milk of the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, Calif., May 30, 1933.

1. The location of oyster beds and the feeding habits of oysters make them generally more subject to pollution than other shellfish.
2. Methods of production, handling and distribution are such as to increase the likelihood of contamination.
3. Large numbers of oysters are eaten raw, whereas most other shellfish are thoroughly cooked before being eaten.

On the Pacific Coast three species of oysters are found: (1) *Ostrea lurida*, or Olympia, which is native to the Pacific Coast; (2) *Ostrea virginica*, or eastern, which has been transplanted from the Atlantic and Gulf states; and (3) *Ostrea gigas*, or Japanese, which has been imported from Japan and is known in the west as the Pacific oyster.

Oysters are an excellent food. They contain proteins, fats, carbohydrates, vitamins A, B, and C and many mineral constituents. Because of their high iron and copper content, they are especially valuable in the treatment and prevention of anemia. No other commonly used food except liver surpasses oysters in the amounts of iron and copper furnished in average servings. Other valuable elements are manganese, calcium and iodine. During the feeding season oysters store up large quantities of glycogen. Glycogen and the other constituents of oysters are easily digested even when eaten raw; consequently, they are an ideal food. It is unfortunate that such a valuable food should be open so easily to contamination either in the growing area or later as it is being handled and distributed. It is the duty of health officials to protect the public by requiring that all oysters be produced, processed, packed and distributed in accordance with approved sanitary methods. The safeguards in the oyster industry should be similar to and as effective as those placed around the production and handling of raw milk.

The state of Washington is by far the largest producer of oysters on the

Pacific Coast. This is due to the fact that there are many extensive areas in the state which are suitable for oyster culture. Suitable bays and inlets in Oregon and California have been developed, but the intensive cultural methods of the Washington growers have not yet been largely adopted by the other states. British Columbia produces Olympia oysters, particularly in Ladysmith Harbor and Boundary Bay, some of which are shipped into the United States.

The phenomenal growth of the Pacific Coast oyster industry during the past three years can be accounted for by the importation of seed oysters from Japan. The most extensive plantings have been made in Puget Sound, Gray's Harbor, and Willapa Bay, all of which are in Washington. Growers in all three coast states have transplanted eastern oysters into the numerous bays available, but except in a few instances the eastern oyster has failed to propagate in western waters. At present most eastern oysters sold on the Pacific slope are secured direct from the Atlantic seaboard.

Japanese oysters have failed successfully to propagate in waters of the Pacific Coast, but because seed oysters may be purchased from Japan so cheaply very little effort has been made to secure heavy sets of "spat." It is probable that the water of the west coast is not sufficiently warm to cause complete development of oyster larvae. Under favorable conditions, heavy sets of native oysters can be secured.

It is evident that the production of Japanese oysters on the Pacific Coast is rapidly increasing. In most bays intensive fishing of the natural oyster beds long ago depleted the native species. Artificial methods of growing now widely practised have resulted in high yields per acre. In this cultural method the Puget Sound oyster growers have led.

Japanese, or Pacific, oysters were first planted on the Pacific Coast in the waters of Puget Sound in 1902, but extensive plantings were not begun until 1928 and 1929. In each succeeding year increasing numbers of cases of seed have been planted. The hardiness of the Pacific oyster, together with the rapidity with which it grows to a

ing opening and packing. It is of prime importance that all market shellfish be taken from clean areas. To determine whether or not a given area is safe, it is necessary to make a sanitary survey of the area and the surrounding country. Bacteriological examinations are made of the shellfish and of the water overlying the beds. The findings

TABLE I  
ANNUAL PRODUCTION OF SHELLFISH ON THE PACIFIC COAST\*

	WASHINGTON		OREGON		CALIFORNIA		TOTAL	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1928								
Eastern Oysters	73,640	\$31,914	—	\$ —	72,630	\$30,699	146,270	\$62,613
Olympia	614,520	312,594	432	480	4,028	1,728	618,980	314,802
All clams and scallops	1,767,795	355,510	110,471	23,668	65,779	25,214	1,944,045	404,392
1929								
Eastern Oysters	8,780	5,698	—	—	43,725	21,862	52,505	27,560
Olympia	608,964	356,443	9,000	6,000	9,295	4,647	627,259	367,090
Japanese	65,796	23,326	—	—	—	—	65,796	23,326
All clams and scallops	1,318,424	240,683	56,600	9,651	55,107	24,869	1,430,131	275,203
1930								
Eastern Oysters	1,970	1,851	—	—	72,796	29,118	74,766	30,969
Olympia	302,659	250,502	8,177	5,310	4,949	3,093	315,785	258,905
Japanese	228,318	82,875	—	—	—	—	228,318	82,875
All clams and scallops	1,325,847	194,293	63,440	8,764	94,288	29,831	1,483,575	232,888
1931								
Eastern Oysters	1,990	1,870	—	—	—	—	—	—
Olympia	312,147	260,960	—	—	—	—	—	—
Japanese	1,373,767	498,000	—	—	—	—	—	—
All clams	1,252,708	184,150	—	—	—	—	—	—

\* Data from reports of Washington State Dept. of Fisheries and U. S. Dept. of Commerce.

marketable size, has been largely responsible for the continued increase in importation. Instead of requiring from 3 to 5 years to attain marketable size, as required by the Olympia and eastern oysters, those imported require from 1½ to 3 years. This rapid growth can be accounted for by the fact that the Japanese oyster passes far greater volumes of water through its gills in a given length of time than the native or eastern species. Since oysters obtain their food by straining out from the water microscopic material such as diatoms, it follows that the more water pumped through the gills the more rapid the growth.

Oysters are more apt to become contaminated on growing areas than dur-

ing opening and packing. It is of prime importance that all market shellfish be taken from clean areas. To determine whether or not a given area is safe, it is necessary to make a sanitary survey of the area and the surrounding country. Bacteriological examinations are made of the shellfish and of the water overlying the beds. The findings

of sanitary surveys are essential in the interpretation of laboratory results and, conversely, laboratory analyses are often necessary to substantiate field data. Sanitary surveys are made to determine the extent of existing and potential sewage pollution both at the growing area and in the surrounding country. In no case can direct fecal pollution of water near growing areas be tolerated. If sewage is discharged into the water at a distant point, consideration is given to the extent of sewage treatment, if any, before discharge, the amount of dilution available, the extent of natural purification which may take place, the temperature of the receiving body of water, and the time of flow to the

oyster beds. The likelihood of pollution from boats must also be given study.

In Oregon water samples for bacterial examination have been collected on both ebb and flood tides. The number has varied with the area under consideration—generally from 12 to 30 samples are taken on a single tide, the points of collection being approximately equidistant over the area studied. After a sanitary survey has been made of the surrounding country, one can usually tell whether to expect the best bacteriological results on the ebb or flood tide. Once this has become known, it has been the practice to limit sample collection to the tide which is apt to give the most pollution. In the early part of the work bottom water samples were often collected, but in most bays there was little difference between the *B. coli* scores of surface and bottom samples. Practically all samples are now collected from 6 inches to 12 inches below the surface.

Occasionally shellfish samples are dredged or tonged from the beds and sent to the laboratory for examination. Most investigators have found a wide variation in the *B. coli* scores of shellfish liquor. These discrepancies, together with the fact that the laboratory examination of shellfish is more laborious and time consuming than that of water, have led most states to rely mainly upon *B. coli* scores of the overlying water. Wide variations in shellfish liquor scores may be due to the fact that we are working with a living organism.

On the Pacific Coast, *B. coli* scores of shellfish liquor averaging about 2 and rarely exceeding 5 have been considered satisfactory. No allowable *B. coli* score, either of shellfish or of water overlying growing areas has been set by the western states. In some eastern states water scores not exceeding 2.3 to 3.6 are specified. Others recommend

a maximum allowable score of 2.5, or not more than 50 per cent of the 1 c.c. portions positive for the coli-aerogenes group. In the west certainly the problem of sewage pollution is not so great as that in the oyster producing areas of the east, for the reason that the population on the Atlantic seaboard far exceeds that on our Pacific Coast.

The recommendations of the U. S. Public Health Service state that laboratory findings should be interpreted in view of the sanitary survey data. This should be done; nevertheless, there is need of a definite standard to be used throughout the country. At present each state seems to have its own standard, or frequently, no definite standard for approved areas.

In the bacteriological examination of shellfish liquor practically all the states follow the standard methods of the A.P.H.A. There is need for uniformity in the examination of water overlying shellfish areas. Routine procedure should include the examination of 5 portions each of 10 c.c., 1 c.c. and 0.1 c.c. of water, following the standard methods used in the bacterial analysis of water. A uniform standard for the quality of shellfish area water should be established, preferably by the U. S. Public Health Service. Standards for the certification of water supplies used on interstate carriers have been established, and there should be no legitimate objection to a reasonable standard for shellfish growing areas, the oysters from which are usually shipped interstate.

The regulations of the Pacific Coast states permit the transplanting of shellfish from unapproved areas to clean areas provided no shellfish are removed for market in less than thirty days. Transplanting must be approved by the state shellfish control authority and must take place when the oysters are feeding actively. Hibernating oysters do not cleanse themselves of pollution even when placed in clean water.

Whenever possible, toilet facilities at culling houses and living quarters are required to be located on land at a safe distance from the water. If it is not possible to provide for land disposal, chemical toilets are required.

TABLE II

CASES \* OF JAPANESE SEED OYSTERS PLANTED  
IN OREGON AND WASHINGTON, 1930-1933

<i>Year</i>	<i>Number of Cases</i>
1930	12,430
1931	15,710
1932	36,600
1933	46,020

\* Each case of seed contains from 12,000 to 16,000 young oysters.

It is difficult, if not impossible, to keep shucked oysters clean during the opening process unless the shell stock is reasonably free from mud. In many areas, particularly where oysters are grown on mud flats, growers have been required to install washing equipment. Pumps using sea water are in general use for washing shellfish at the live floats.

Shucking and packing plants are required to be similar in construction to modern milk plants. Those approved by the state health departments have floors and opening benches of concrete or other equally impervious material. Smooth surfaced, painted and easily cleaned walls and ceilings, as well as plenty of light and ventilation have been required in all modern plants. All equipment with which shucked oysters come in contact is of smooth, hard surface material, free from corrosion, and free from seams, cracks and grooves in which bacterial slime or food particles may collect. Approved plants also have adequate facilities for the cleaning and bactericidal treatment of all utensils, containers, etc., as well as an abundant supply of hot and cold water under pressure.

It is practically impossible to keep

shucked oysters free from shell particles and other foreign matter during the opening process. It is, therefore, necessary to wash the shucked stock before it is packed for market. This can best be done with clean cold water. Various methods are used, but in most plants blowers or sprays have been found most effective. Whatever method is used, the washing process should be completed in three minutes or less. Shucked shellfish will "soak up" much fresh water if washed for long periods or allowed to stand in water. Some plants have found a 2 per cent to 3 per cent salt solution helpful in cleansing the oyster meats of adhering slime and particles of dirt.

Pacific oysters vary in size to such an extent that they must be graded at packing plants. Small oysters have a higher market value than large. Sorting or grading is done on monel metal tables which drain into the washing sink. Monel metal has been more successful for equipment and utensils than any other because it does not corrode and is easily kept clean and bright.

Refrigerators are used at all plants to cool shucked shellfish immediately after the washing and packing process. A temperature above freezing but below 50° F. is maintained in all cooling units. No ice or ice water is permitted to come in direct contact with shucked shellfish.

In an industry where there are so many dangers of transmitting the germs of infectious diseases to the product, rigid standards of cleanliness of employees must be enforced. Health examinations are given to all plant employees, and especial effort is made to detect carriers of typhoid, para-typhoid or other communicable diseases. No person who is suffering from, or is a carrier of, contagious disease or who has infected wounds on his arms or hands is permitted to work. All employees must wear clean garments. In addition,

shuckers must wear rubber or oil skin aprons and those washing or packing shellfish must wear rubber gloves. Washing facilities with hot and cold water, soap and individual towels, as well as sanitary toilet facilities, are a necessary part of all plants. All employees are required to wash their hands after each visit to the toilet and

signs to this effect must be posted in conspicuous places.

Uniform requirements and constant supervision over shellfish growing areas and shucking plants on the Pacific Coast are necessary to protect the public health and, incidentally, to encourage and safeguard a rapidly developing industry.

---

## International Congress on Working Mothers and Their Children

THE first international congress on working mothers and their children was held in Paris from June 7 to June 11, 1933, under the auspices of the Union Feminine Civique et Socials. The purpose of the congress was to call the world's attention to the evils of the employment of mothers outside the home and to discuss its causes and remedies. The congress was attended by delegates from more than 20 countries, among them the United States.

Reports were read on the condition of wage earning women in various countries. It was pointed out that in France 35 to 40 per cent of all married women were employed outside their homes, and in this way 700,000 homes were deprived of their mothers during work hours; in Germany the number was almost the same; in Brazil, of 150,000 women factory workers 50,000 were married and had children; in Poland the number of working women was larger than that of working men; in Austria the number of married working women had constantly increased. It has been found that a married woman's work outside the home necessitates expenses which amount on the average to 50 per

cent of her earnings. The delegates spoke against day nurseries for infants, day centers for older children, and other unsatisfactory but costly measures that should be replaced by allowances to mothers, coöperative societies, and mutual aid funds, and by other arrangements. All speakers urged legislative measures for safeguarding the family.

The resolutions passed asked among other things for the payment of a wage sufficient to meet the normal needs of a family with the mother staying at home. In the meantime the conditions of women in employment should be made as satisfactory as possible. Society must increase the number of agencies, particularly mutual aid agencies, aiming to aid the home and to give a certain amount of security to the family. It was stated that international, as well as national, legislation is needed for this purpose.

Finally, the congress urged the establishment in all countries of committees, such as are already in existence in some countries, for the carrying out of the resolutions.—*Journal des Débats*, June 5-15, 1933; *Le Temps*, June 7-12, 1933; and *Le Matin*, June 5-13, 1933.

# Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity\*

ELIZABETH PARKHURST

*Senior Statistician, Division of Vital Statistics, New York State  
Department of Health, Albany, N. Y.*

OFFICIAL vital statistics do not always measure accurately the natality and mortality of communities, mainly because of the general practice of registering births and deaths in the place of their occurrence, which often is not the permanent residence of the mother or of the decedent. In 1926, therefore, the Division of Vital Statistics of the New York State Department of Health undertook the task of measuring in a logical and consistent manner the natality and mortality among the residents of the more important administrative units of the State. Birth rates and death rates corrected for change of residence are now published in the annual reports of the Division. Special attention has been given to the determination of resident mortality from tuberculosis because the segregation of many sufferers from this disease in hospitals and sanatoria distorts, often to a degree of uselessness, the recorded rates of mortality in many urban and rural areas.† Table I illustrates the weight of residence in areas even as large as the city of New York and the entire urban and rural sections of the rest of the State:

The purpose of this paper is to analyze the resident tuberculosis mortality in the State and its main subdivisions according to sex, age, color, and nativity. The period chosen is the triennium 1929-1931. The fact that the latest census data are for the mid-year 1930 makes, of course, for the greater accuracy of the computed rates.

The number of deaths from all forms of tuberculosis of residents of New York City which occurred anywhere in the State in the course of the three-year period was 16,703; the corresponding number of deaths for the rest of the State was 10,134, of which 6,943 were of residents of the urban territory, 3,191 of rural New York. The rates per 100,000 population according to sex and age were as shown in Table II.

The curves of mortality for males begin with a peak in the youngest age

† See: J. V. DePorte, Recorded and Resident Death Rates from Tuberculosis in New York State in 1926, *Am. Rev. Tuberc.*, XVII:634-662, June, 1928. (This paper also contains a detailed description of the method employed in the allocation of deaths according to residence.)

J. V. DePorte, Some Aspects of the Recorded and Resident Mortality from Tuberculosis in New York State in 1927 and 1928, *Am. Rev. Tuberc.*, XXII:87-115, July, 1930.

Jessamine S. Whitney, Study of Urban and Rural Tuberculosis Death Rates in New York State. *A. J. P. H.*, XVIII:978-984, Aug., 1928.

Edgar Sydenstricker, The Trend of Tuberculosis Mortality in Rural and Urban Areas, *Am. Rev. Tuberc.*, XIX:461-482, May, 1929.

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

TABLE I

RECORDED AND RESIDENT DEATH RATES, PER 100,000 POPULATION, FROM ALL FORMS OF TUBERCULOSIS

Year	Recorded			Resident		
	New York City	Rest of State		New York City	Rest of State	
		Urban *	Rural *		Urban *	Rural *
1926	85.4	70.6	88.4	94.2	83.3	60.0
1927	78.1	64.3	81.7	85.9	75.2	57.4
1928	79.4	63.6	82.1	88.0	73.9	56.2
1929	75.5	58.8	80.6	83.3	71.1	54.1
1930	73.1	51.5	78.6	80.3	63.3	53.4
1931	69.4	48.1	72.7	76.5	61.1	44.6

\* *Urban* includes cities and other incorporated places whose population was 2,500 or more. *Rural* includes the remainder of the Upstate area.

group, under 5 years, coming down to a minimum in the age group 10-14 years and rising to a maximum at 55-64 years in New York City with the next highest rate at 45-54 years; in the urban part of the rest of the State the maximum rate was that at 45-54, the rate at 55-64, however, being of practically the same magnitude. In rural New York the peak was in the oldest

TABLE II

RESIDENT DEATH RATES, PER 100,000 POPULATION, FROM ALL FORMS OF TUBERCULOSIS BY SEX AND AGE: NEW YORK CITY AND URBAN AND RURAL AREAS OF REST OF STATE, 1929-1931

Age	Males			Females		
	New York City	Rest of State		New York City	Rest of State	
		Urban	Rural		Urban	Rural
Total	97.6	76.2	55.5	62.2	53.7	46.2
Under 5 Years	49.0	31.0	20.5	41.2	27.9	17.8
5-9 years	10.6	10.8	5.6	8.0	9.5	4.5
10-14 years	9.7	11.3	6.7	15.2	13.4	9.7
15-19 years	45.1	36.2	24.1	76.9	65.1	43.9
20-24 years	87.8	67.0	42.9	107.9	91.5	96.6
25-29 years	101.2	80.8	70.1	93.5	89.8	82.8
30-34 years	107.2	94.0	87.4	80.2	74.0	77.0
35-44 years	132.9	107.6	90.6	57.2	56.7	51.8
45-54 years	170.9	131.6	77.6	56.8	48.5	41.6
55-64 years	198.6	131.4	75.8	65.4	54.8	47.1
65-74 years	163.6	114.8	81.5	67.7	61.3	61.5
75 years and over	115.5	75.7	92.5	70.0	53.6	68.9



age group, 75 years and over, with an almost equally high rate at 35-44 years. Among females, we also find a peak in the youngest age group, under 5 years, with the minimum in the next group, 5-9 years; the maximum rates, however, were in much younger age groups than among males, the mortality in all three sections of the State being relatively highest among young women 20-24 years.

The total death rate in New York City exceeded the corresponding rate in the rest of the urban territory of the State by 28 per cent among males and 16 per cent among females. Specific death rates by age were, with the exception of the age groups 5-9 years and 10-14 years, higher in New York City, the excess ranging from 14 per cent in the group 30-34 to 58 per cent among children under 5 years. Since the last group is numerically small, it is important to note the excess in New York City mortality in the large group 55-64 years where it equalled 51 per cent. Among children 5-9 years of

age the rates were virtually equal, while in the next group, 10-14 years, the New York City rate was 14 per cent lower.

The death rates among females were higher in New York City at all ages, with the exception of 5-9 years. The excess of the New York City mortality, however, was not so great as among males, ranging from 1 per cent between 35 and 45 years to 48 per cent in the numerically small group under 5 years. Among children between 5 and 10 years, the New York City mortality was 16 per cent below the upstate urban rate.

Similarly, the urban upstate rate exceeded the rural rate at almost all ages, the exceptions being the groups 75 years and over among both sexes and 20-24, 30-34, and 65-74 years among females. The excess of the urban mortality upstate among males ranged from 8 per cent in the group 30-34 years to 93 per cent among children 5-9 years; next in size was the disparity in the age group 55-64 years—73 per cent.

GRAPH I

Resident Death Rates per 100,000 Population from All Forms of Tuberculosis by Sex and Age, in New York City and Urban and Rural Areas of Rest of State, 1929-1931.

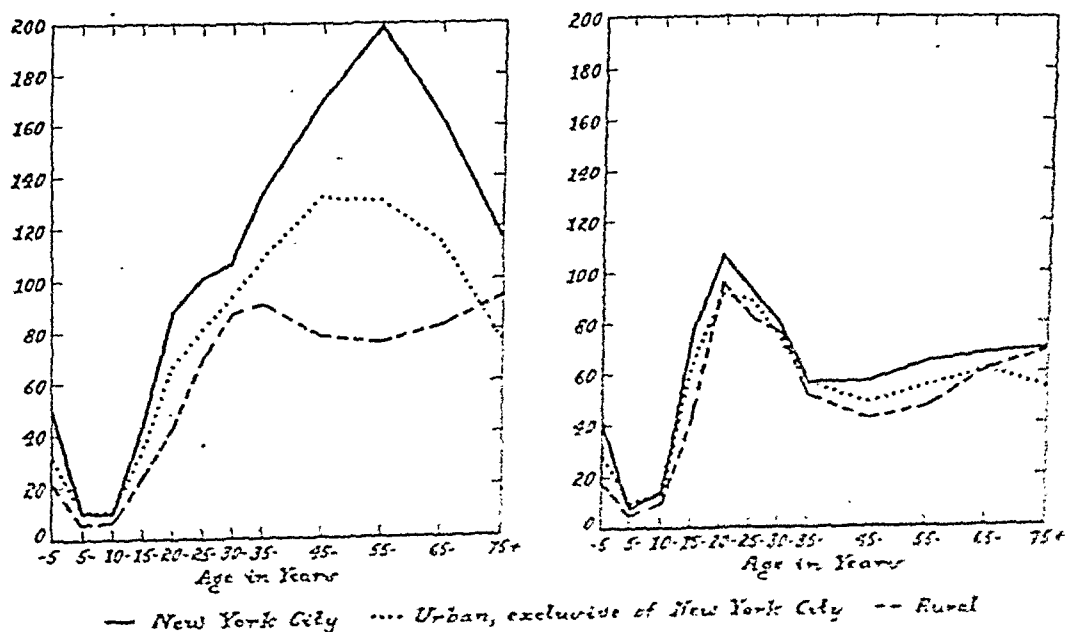


TABLE III  
RESIDENT DEATHS AND DEATH RATES FROM ALL FORMS OF TUBERCULOSIS BY SEX, AGE, COLOR AND GENERAL NATIVITY:  
NEW YORK STATE, EXCLUSIVE OF NEW YORK CITY, 1929-1931

Age	Deaths										Rates per 100,000 Population				
	Total	White					Colored		Total	White			Negro		
		Total	Native-born		Foreign-born	Country of birth not stated *	Negro	Other colored		Total	Native-born			Foreign-born	
			Native parent-age	Foreign or mixed parent-age							Native parent-age	Foreign or mixed parent-age			
MALES															
All Ages	5,822	5,438	1,891	1,807	231	1,479	361	23	68.3	64.9	42.4	72.5	104.1	283.0	
Under 5 years	186	163	113	42	4	4	22	1	26.9	21.0	24.5	19.7	92.4	210.0	
5-9 years	68	60	29	28	3	5	8	—	8.8	7.9	6.1	10.4	—	77.7	
10-14 years	73	66	32	28	1	—	7	—	9.5	8.7	7.4	6.2	27.6	80.5	
15-19 years	224	198	86	94	3	15	24	—	31.6	28.3	22.3	33.5	45.7	283.3	
20-24 years	394	342	149	143	6	43	50	2	58.7	52.0	40.8	63.6	63.9	382.3	
25-29 years	492	448	184	174	9	80	41	3	77.3	72.4	54.6	99.1	75.0	262.1	
30-34 years	591	537	214	176	19	128	52	2	91.8	85.5	66.1	103.9	94.9	356.9	
35-39 years	1,334	1,255	393	370	46	436	73	6	101.6	97.5	65.0	123.5	114.0	320.7	
40-44 years	1,340	1,255	393	370	48	475	45	2	111.0	108.1	67.1	146.9	121.3	325.2	
45-49 years	1,140	1,093	314	343	45	375	26	2	107.7	104.8	64.7	134.6	117.8	331.6	
50-54 years	762	734	208	251	45	227	9	2	102.2	100.3	64.6	117.2	115.6	370.8	
55-64 years	424	413	125	125	32	129	2	2	81.6	82.1	50.7	118.2	87.1	389.9	
65-74 years	134	129	44	33	15	37	4	1							
75 years and over															
FEMALES															
All Ages	4,312	3,985	1,699	1,413	133	731	302	25	51.0	47.9	38.2	54.4	57.4	236.4	
Under 5 years	161	136	83	48	4	1	22	3	24.0	20.7	18.6	23.1	24.4	198.0	
5-9 years	57	49	32	16	—	—	8	—	7.6	6.7	7.0	6.1	6.3	75.8	
10-14 years	89	74	31	40	1	2	15	—	12.0	10.1	7.4	13.5	11.5	163.2	
15-19 years	409	375	156	182	3	32	31	—	57.8	53.9	41.7	64.9	88.3	292.9	
20-24 years	636	588	277	237	15	59	42	3	93.1	88.1	73.7	106.3	80.3	282.5	
25-29 years	564	514	223	200	13	77	47	3	87.6	81.9	65.5	108.9	74.4	301.3	
30-34 years	488	443	191	150	14	88	60	4	75.0	69.6	57.8	83.1	69.9	314.0	
35-39 years	693	630	257	194	15	163	46	3	55.0	50.9	42.6	59.8	52.4	289.9	
40-44 years	457	436	172	126	22	115	19	2	46.1	44.5	37.1	48.5	45.1	152.6	
45-54 years	370	364	116	113	19	114	6	—	51.9	51.5	36.2	53.7	64.8	106.6	
55-64 years	269	260	103	80	15	60	8	1	61.3	59.7	50.2	64.0	56.9	319.7	
65-74 years															
75 years and over	119	116	58	27	12	19	3	—	60.5	59.3	53.0	73.6	38.5	246.9	

\* The numbers in these columns were not considered in the computation of the rates. It is clear, however, that their distribution upon any basis would not change the relationship between the rates of the several nativity groups.

Among females, the excess of urban mortality was greatest under 20 years, the disparity being as high as 111 per cent at 5-9 years. After age 20 the maximum difference was only 17 per cent, in the age group 45-54.

The striking fact that the major portion of the excess mortality in New York City and in the urban part of the rest of State as compared with rural New York was among males between the ages of 45 and 65 is clearly seen in Graph 1.

Another interesting form of comparison is that of the male and the female mortality. The total death rate among males exceeded the rate among females by 57 per cent in New York City, 42 per cent in the urban part of the rest of State, and 20 per cent in rural New York. The most significant fact is the excess of female mortality in the three sections of the State between 10 and 25 years of age. In addition, upstate, the mortality among females was higher than among males also in the age group 25-29 years. At all of the other ages in New York City the death rate among males was higher, the disparity being greatest, over 200 per cent, between 45 and 65 years. In the urban part of the rest of the State and in rural New York the mortality among males was relatively highest at 45-54, exceeding the female mortality by 171 and 87 per cent, respectively.

The analysis of resident tuberculosis mortality by color and general nativity had to be limited to the upstate area only, the necessary data for New York City not being available. Table III shows the specific death rates in the State, exclusive of New York City, according to sex, age, color, and the general nativity of the white population.

The death rate among negro males, 283.0, was more than four times the corresponding rate among whites, 64.9; the rate among negro females, 236.4,

was almost five times that among whites, 47.9. Without exception, the specific death rates by age were much higher than among whites. While the numbers upon which the negro rates are based are relatively small, deaths of negro males numbering 361 and females, 302, as compared with 5,438 and 3,985 for whites, the differences between the rates are of such magnitude that they are undoubtedly significant.

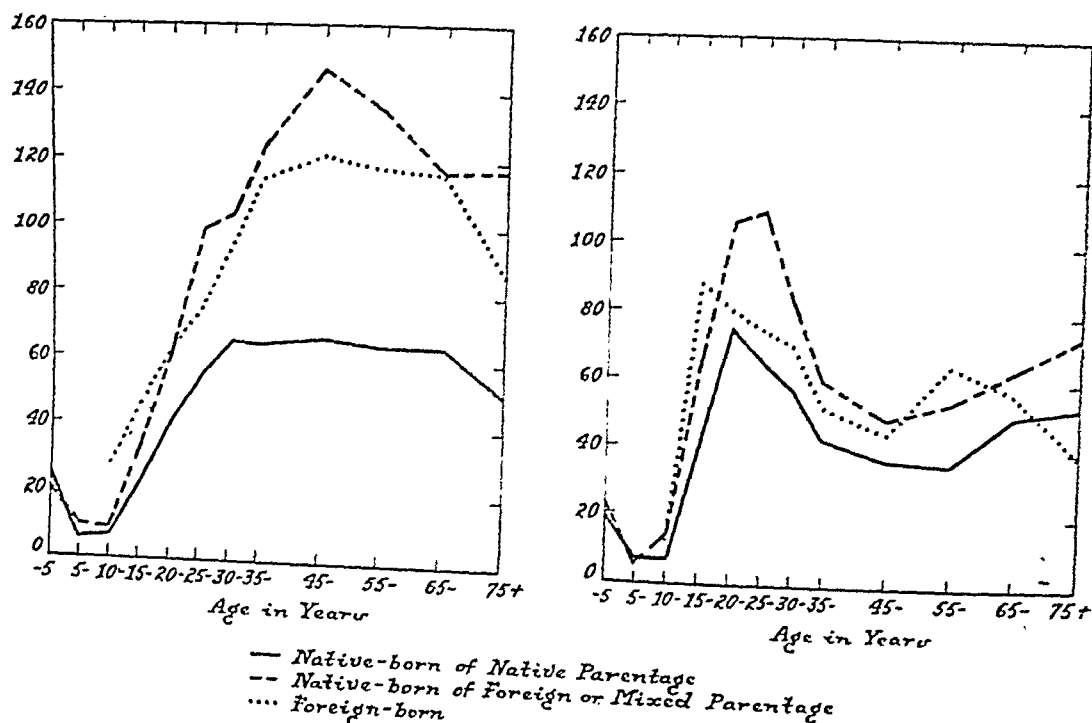
Among the three general nativity groups of the white population, the total death rate was lowest for the native-born of native parentage followed by the first native-born generation, the rate for the foreign-born being highest. When, however, we consider the mortality by age, we find that practically all the specific rates were higher among the first native-born generation than among the foreign-born. The differences between the rates for native-born persons of native parentage and those for persons of foreign birth or of immediate foreign origin were especially marked among adult males (see Graph 2). When the rates for the three groups are corrected for differences in the age distribution (by adjusting them to the population of the state, exclusive of New York City, according to age and sex), they are found to be as follows:

	<i>Males</i>	<i>Females</i>
Native-born of native parentage	45.0	39.3
Native-born of foreign or mixed parentage	82.3	56.5
Foreign-born	80.9	50.9

When the analysis is extended to the leading racial strains it is advisable to group the entire area of eastern and central Europe into a single unit because, in many instances, the information given on death certificates regarding country of birth does not correspond to the post-war boundaries. In no other way could one explain a tuberculosis rate of 279.8 for natives of Austria when the natives of Czecho-

GRAPH II

Resident Death Rates per 100,000 Population from All Forms of Tuberculosis by Sex, Age, and General Nativity of White Persons, in New York State, exclusive of New York City, 1929-1931.



slovakia show a rate of only 47.9; or a rate for natives of Hungary of 133.4, while the natives of Yugoslavia show a rate of less than half, 59.7. Although there were also modifications in the territories of Denmark and Italy, they were not sufficiently large to influence the validity of the rates.

The necessary population data not being available, it is impossible to make correction for differences in the age distribution of the foreign-born and the first native-born generation. No deductions, therefore, may be drawn from the comparative size of the total rates. It is interesting to note, however, that notwithstanding the undoubtedly more favorable age composition of the first native-born generation, the total death rate for persons of Irish parentage was higher than the corresponding rate for the natives of Ireland. Among the foreign-born, the Irish had the highest rate followed by natives of eastern and central Europe, while the Canadians and Italians showed the

lowest rates. In the group of native-born of foreign or mixed parentage, persons of Irish stock had the maximum

TABLE IV

RESIDENT DEATH RATES, PER 100,000 POPULATION FROM ALL FORMS OF TUBERCULOSIS: NEW YORK STATE, EXCLUSIVE OF NEW YORK CITY, 1929-1931

Country of Birth or Origin	Foreign-born	Native-born of Foreign or Mixed Parentage*
Total	82.0	63.3
Canada	57.0	55.3
England, Scotland, Wales	62.0	58.5
Ireland	108.8	114.0
Norway, Sweden, Denmark	82.8	64.1
Italy	57.5	36.6
Eastern and central Europe†	100.2	59.3
Other foreign countries	106.0	54.7

\* By country of birth of father, or if father was native-born or of unknown nativity, by country of birth of mother.

† Austria, Czechoslovakia, Germany, Hungary, Lithuania, Poland, Roumania, Russia, Yugoslavia.

rate and the Italian group the minimum.

Table V shows the death rates by age, sex, color, and general nativity in the urban and rural areas. The death rate of negro males was 345.3 in the urban area as compared with 117.6 in the rural area, and of negro females 280.1 in the urban area as compared with 106.0 in the rural. The total urban rate for males was 37 per cent higher than the corresponding rural rate and for females 11 per cent higher; if the death rates of whites only are considered, these differences are cut to 31 and 10 per cent, respectively.

The relationship mentioned earlier between the age and sex specific death rates for the three general nativity groups in upstate New York is found to exist when the urban and rural parts of the State are considered separately. Among males, the urban rates were higher than the rural except at 25-34 years for the two classes of native-born and at 35-44 years and the numerically unimportant group "under 15 years" for the foreign-born. The disparity between the rates was greatest between 45 and 65 years: 42.5 per cent for the native-born of native parentage, 73.3 per cent for the first native-born generation, and 56.0 per cent for the foreign-born. Among females, the differences in the urban and rural rates were negligible, the rural rates slightly exceeding those in the urban area between 25 and 45 years for the native-born of native parentage, between 15 and 45 and after 65 years for the first native-born generation, and between 25 and 45 for the foreign-born.

If the distribution of the rural population according to age, sex, color, and general nativity were the same as in the urban upstate area the total rural rate would be increased from 51.0 to 55.3. This corrected rate is still 15 per cent lower than the urban rate, 64.8.

*General Summary*—In 1929-1931, the excess of the resident tuberculosis

mortality in New York City and in the urban part of the rest of the State, as compared with that of rural New York, was almost wholly due to the higher death rates among adult males, particularly between the ages of 45 and 65 years.

The death rates among males exceeded the rates among females at practically all ages with the important exception of the age groups 10 to 25 years in New York City and 10 to 30 years in the rest of State, where the mortality among females was *higher* than among males. The excess of male mortality was greatest in New York City, amounting to as much as 200 per cent between the ages of 45 and 65. In the urban and rural parts of the rest of State the difference was greatest in the age group 45 to 54 years—171 per cent in the urban and 87 per cent in the rural area.

The death rate among negroes greatly exceeded that among whites. The difference was especially marked in the urban area, where the negro male rate was 4.8 times and the female rate 5.2 times the white rate. In the rural area the negro rates for both males and females were slightly more than twice the corresponding rates among whites.

In the three general nativity groups of the white population, the total death rate was lowest among the native-born of native parentage, followed by the native-born of foreign or mixed parentage—the rate among the foreign-born being highest. When age specific death rates are considered, however, the rates at practically all ages are found to be *higher* among the first native-born generation as compared with the foreign-born. The differences were greater among males than among females and greatest among males between the ages of 45 and 65 years.

Among persons of foreign birth or immediate foreign origin, the crude death rates were highest among the

TABLE V  
RESIDENT DEATHS AND DEATH RATES FROM ALL FORMS OF TUBERCULOSIS BY SEX, AGE, COLOR AND GENERAL NATIVITY:  
URBAN AND RURAL AREAS OF NEW YORK STATE, EXCLUSIVE OF NEW YORK CITY, 1929-1931

Age	Deaths										Rates per 100,000 Population				
	Total	White					Colored		Total	White			Negro		
		Total	Native-born		Foreign-born	Country of birth not stated*	Negro	Other colored		Total	Native-born parent-age	Foreign or mixed parent-age			
			Native parent-age	Foreign or mixed parent-age											
URBAN															
Males-All ages	4,024	3,694	1,099	1,332	126	1,117	20	320	10	76.2	71.3	45.7	76.2	108.8	345.3
Under 15 years	235	198	109	78	6	5	-	36	1	17.2	11.8	14.7	17.8	17.8	173.0
15-24 years	453	384	143	190	6	44	1	67	2	51.6	41.5	34.3	51.3	58.4	443.8
25-34 years	743	655	228	250	17	159	1	86	2	87.4	79.5	58.5	99.5	86.6	371.0
35-44 years	919	852	233	265	27	322	5	65	2	107.6	102.0	67.6	127.2	113.8	379.5
45-64 years	1,370	1,304	310	451	55	476	12	63	3	131.5	127.1	77.5	166.4	134.0	410.8
65 years and over	304	301	76	98	15	111	1	3	-	104.8	104.6	67.6	130.3	110.8	149.9
Females-All ages	2,919	2,648	1,001	1,023	78	538	8	268	3	53.7	49.6	39.8	54.2	57.6	280.1
Under 15 years	221	180	88	86	3	3	-	40	1	16.5	13.7	12.2	15.3	10.9	180.5
15-24 years	737	672	274	309	12	76	1	65	-	78.1	73.1	61.0	80.3	89.3	400.5
25-34 years	722	640	245	259	18	117	1	80	2	116.0	74.6	59.0	94.9	67.3	357.6
35-44 years	472	418	150	140	8	119	1	54	-	56.7	51.2	42.2	52.8	52.4	339.7
45-64 years	551	530	165	171	24	167	3	21	-	51.1	49.8	38.8	52.1	53.7	157.8
65 years and over	216	208	79	58	13	56	2	8	-	59.0	57.2	52.9	54.9	51.5	318.2
RURAL															
Males-All ages	1,798	1,744	792	475	105	362	10	41	13	55.5	54.6	38.6	63.7	91.9	117.6
Under 15 years	92	91	65	20	2	4	-	1	-	10.6	10.6	10.3	9.2	37.2	11.5
15-24 years	165	156	92	47	3	14	-	7	2	32.9	31.6	27.5	34.8	56.3	108.4
25-34 years	340	330	170	100	11	49	-	7	3	78.9	78.1	62.0	106.7	84.7	99.5
35-44 years	415	403	160	105	19	114	-	8	4	90.6	89.3	61.5	115.0	114.6	142.1
45-64 years	532	523	212	143	38	126	4	8	1	76.8	76.3	54.4	96.0	85.9	144.7
65 years and over	254	241	93	60	32	55	1	10	3	89.7	85.7	55.1	101.1	102.0	688.7
Females-All ages	1,393	1,337	698	390	55	193	1	34	22	48.2	44.9	36.2	55.2	56.7	106.0
Under 15 years	86	79	58	18	2	1	-	5	2	10.4	9.7	9.7	8.7	10.2	57.5
15-24 years	308	291	159	110	6	15	1	8	9	68.3	65.7	53.0	92.7	61.0	128.6
25-34 years	330	317	169	91	9	48	-	8	5	79.9	78.1	65.2	99.8	86.4	127.4
35-44 years	221	212	107	54	7	44	-	6	3	51.8	50.3	41.4	59.9	52.5	125.0
45-64 years	276	270	123	68	17	62	-	4	2	43.0	43.4	31.3	47.7	41.3	83.8
65 years and over	172	168	82	49	14	23	-	3	1	63.9	62.8	49.6	87.4	50.0	249.4

\* See footnote to Table III.

Irish and lowest among the Italians. In spite of the more favorable age distribution of the population, the death rate of native-born persons of Irish parentage was higher than that of natives of Ireland.

When correction is made for differences in the distribution of the population by age, sex, color, and general nativity, the total rural resident rate is found to be 15 per cent below the urban rate.

#### CONCLUSION

The causative factors in the higher urban mortality from tuberculosis are very likely environmental, since the excess over rural mortality remains when correction is made for the unlike sex, age, color, and nativity composition of the population. In view of the fact that the disparity is greatest among males between the ages of 45 and 65, it seems reasonable to assume that occupation is an element of prime importance.

---

## Relative Merits of Raw and Pasteurized Milks

. . . There are, therefore, strong grounds for the belief that infants can satisfy all their requirements on diets of adequate amounts of pasteurized milk provided that extra vitamin D, and, of course, vitamin C, are added to the diet.

The subject is, however, one which demands further investigation. No body of evidence is available on which a really conclusive statement of the relative merits of raw and pasteurized milk, when fed without vitamin supplements, can be founded. This is surprising in view of the facilities afforded by child clinics for a really informative study of the question. Moreover, our whole knowledge of the metabolism of infants is singularly meager, and it is highly desirable that further work should be done in this field. More especially is it desirable, in view of the

importance of calcium and phosphorus in the building up of the skeleton, that the requirements of children for these elements at various stages in the life-history should be more firmly established. Investigation should also be made into the quantity of milk which is necessary for the optimum retention of calcium and phosphorus, while the effect of variations in the vitamin D intake should also be studied. In this way there could be built up a body of knowledge which would not only be of great value in determining the relative merits of raw and pasteurized milk in infant feeding, but which would furnish a useful guide to pediatricians in the more general field of infant dietetics. —J. S. Stirling and J. H. Blackwood. *The Nutritive Properties of Milk in Relation to Pasteurisation*. Hannah Dairy Research Institute. *Bull.* 5, p. 75.

# The Treatment of Water by Certain Forms of Silver

JAMES GIBBARD, F.A.P.H.A.

*Bacteriologist, Laboratory of Hygiene, Department of Pensions and National Health, Ottawa, Ont.*

IN Canada and the United States one seldom hears of any process other than filtration and chlorination recommended for the treatment of polluted water supplies. Recently a new method involving the use of silver, has been receiving considerable attention, especially in Europe. The apparatus designed to apply this new process is now sold in Canada and presumably in the United States, and it is believed that patent rights for this new method have been issued.

This process depends upon the so-called oligodynamic action of silver. It is a well-known fact, first reported by Naegeli in 1893, that silver metal exerts an inhibitive action toward bacteria, algae and certain other forms of microscopic life. The term "oligodynamie," coined by Naegeli, is used to define that bactericidal action of silver, copper, mercury, etc., and their salts, which occurs in such a dilute concentration that a chemical determination is extremely difficult. In fact for many years the inhibitory action of the metals was thought to be mysterious, but it is now generally accepted that the metals act only through the solution of traces of salts or oxides on their surface. When water is exposed to metallic silver it develops oligodynamic properties reaching a maximum in about eight days, but if the area of metal exposed to water is increased many hundreds of times the time factor is greatly reduced.

In this new process silver with or without certain "activators" such as palladium or gold, is deposited on the surface of sand, porcelain, or filter candles. Water is then passed through the filter or allowed to remain in contact with the silvered porcelain for a certain time. Very striking claims are made for this method:

- (1) There is no taste, odor or color to water treated by this method.
- (2) Water which has been exposed to silver has the power of sterilizing other polluted water mixed with it.
- (3) It is claimed to sterilize polluted water independent of the temperature of exposure.
- (4) There is no reduction in the efficiency of this new process by the presence of minerals or organic matter in the water.
- (5) The quality of the water is only of importance when it contains much suspended matter.
- (6) It is recommended for the treatment of water in swimming pools, laundries, drains, ice plants, etc.
- (7) Certain claims for medicinal application are made.

It will be seen that *if* this process is all that is claimed for it, we have available the ideal method of treating polluted water.

It is well at this stage to point out that although this process has important limitations, it has some points in its favor, and, in the author's estimation, is worthy of considerable further research.

As regards "oligodynamie" in gen-



eral, there have been at least 200 publications dealing with various phases of the problem.

Suckling<sup>1, 2</sup> studied this method of treating water and concluded that "it is a delicate process susceptible to interference by many factors such as temperature, turbidity, sulphides, chlorides, iron and organic matter. As far as public water supplies are concerned, the process is applicable to few and carefully selected cases. It is superior to chlorination in certain minor respects such as the entire absence of odor and taste production." He believes that it "may meet a long-felt need as a means of sterilizing water in the case of small supplies, country homes, etc."

It seemed desirable to obtain some first-hand data regarding this new process, while for comparison, studies on silver-plated porcelain, colloidal silver and silver nitrate were included.

One specimen of the commercial apparatus was obtained. The sterilizing elements consisted of small unglazed porcelain rings, each approximately 1.5 cm. in diameter, 1.5 cm. deep, the walls 0.2 cm. thick. These rings had silver in some form, presumably metallic, on the surface. Upon breaking a ring and heating it with  $H_2S$ , marked discoloration occurred at the surface only and it is therefore concluded that silver was deposited only on the surface. A quantitative determination of silver on 1 ring indicated 7.5 mg. There is undoubtedly considerable variation, as microscopic and macroscopic examination showed a considerable unevenness in deposit. The apparatus, which was designed to treat, by contact, 1,300 c.c. of water, contained approximately 400 rings. The directions were simply to rinse the jar, fill with water, allow to stand two hours, when the water would be found to be sterile unless it had approached sewage in its degree of contamination, in which case 6 to 7 hours would be necessary.

Preliminary experiments were done with the sterilizer as sold by the manufacturers. The jar was filled with tap water to which enough of broth culture of *B. coli* or *B. typhosus* was added to give approximately 1 million viable organisms per c.c. The test was conducted at 22° C. At half-hour intervals 5 c.c. of water were removed from the jar and inoculated into Smith fermentation tubes of lactose broth. Growth occurred from samples removed after one hour, but all cultures were negative after two hours' exposure. Those tubes which showed no growth were then reinoculated with the test organism, in order to determine whether or not enough of the inhibitive material might be carried over to prevent growth. In every case excellent growth took place. It was concluded that the process warranted further study.

It was considered advisable to remove the silvered rings from the apparatus for experimental purposes, and place them in 400 c.c. pyrex beakers for further study, in order that they would not all be affected by some special experiment. In addition broken porcelain insulators and later porcelain rings, plated with silver by one of the usual chemical reduction methods, were used in identical experiments.

Distilled water suspensions of 24 hour broth cultures of *B. coli* were used. Five c.c. amounts of the suspension were removed at half-hour intervals and inoculated into lactose broth Smith fermentation tubes. In this report "sterility" means that growth did not occur when the sample was inoculated into lactose broth and incubated at 37° C. for 48 hours.

At room temperature (22° C.) water with approximately 2 million *B. coli* per c.c., was sterilized by silvered commercial rings in slightly less than four hours; at 37° C. in two hours, while at 10° C. not even after 22 hours. Identical results were obtained with the

silvered rings prepared in the laboratory.

A variety of experiments was conducted, during which it seemed as if both the commercial and the laboratory rings were losing their efficiency, so a comparison was made with new rings. Sterility was obtained at room temperature within four hours with the used rings, but in two hours with the new ones.

These results were repeated several times and indicated that under continued use there is a gradual loss of efficiency of both commercial and laboratory rings. It was believed that the use of broth cultures in preparing the suspensions of *B. coli* for test purposes might be a factor through the addition of organic matter. Only 1 to 2 c.c.'s of a broth culture were used to prepare a litre of suspension, and this quantity of broth would represent very little organic matter. In order to avoid objections on this point, all further suspensions were, unless otherwise stated,

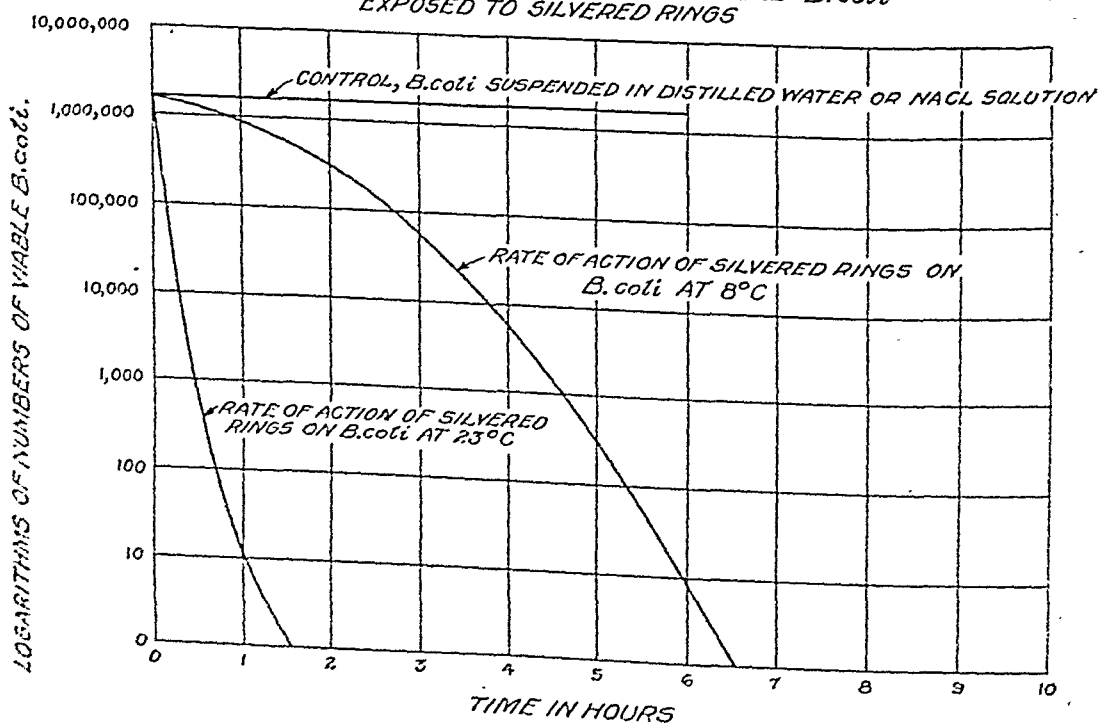
prepared from *B. coli* grown on an agar slant and filtered through paper. Even under these conditions there is a gradual loss of efficiency of the rings.

It was also found that when the bacterial content was greatly increased, there was a corresponding increase in the time necessary for sterilization. Water with 500,000 *B. coli* might be sterilized at room temperature within 1½ hours, but with 10,000,000 per c.c. may take ten hours. Although it is possible that the same rate of action on *B. coli* took place in both samples, the result was a greatly increased time.

Temperature plays an important rôle in sterilization. Distilled water containing a suspension of *B. coli* may be sterilized in from 1½ to 2 hours at 22° C., while at 8° it may require six or seven hours, indicating that even with the most favorable type of water the temperature is a very important factor.

Sixteen experiments were conducted to determine rates of reduction in the

FIGURE 1.  
RATE OF REDUCTION IN NUMBERS OF VIABLE *B. coli*  
EXPOSED TO SILVERED RINGS



number of *B. coli* suspended in distilled water when exposed to silvered rings at room and refrigeration temperatures. Control experiments were conducted on *B. coli* suspended in distilled water and 1 per cent sodium chloride. The cultures for these control tests were grown on either sodium chloride free agar or 1 per cent sodium chloride agar. A semi-logarithmic graph (Figure 1) shows these results to the best advantage.

Table I shows the silver content of water exposed to silvered laboratory and commercial rings. The spectrograph was employed.

TABLE I

SPECTROGRAPHIC QUANTITATIVE DETERMINATIONS OF SILVER IN WATER \*

<i>Water exposed to silvered commercial rings</i>	<i>Silver in parts per million</i>
After 1 hr. exposure	0.03 p.p.m.
After 2 hrs. exposure	0.07 p.p.m.
After 4 hrs. exposure	0.15 p.p.m.
After 8 hrs. exposure	0.5 p.p.m.
<i>Water exposed to silver plated laboratory rings</i>	
After 1 hr. exposure	0.125 p.p.m.
After 4 hrs. exposure	0.2 p.p.m.

\* Acknowledgment is gratefully expressed to Mr. J. Dick for conducting these analyses.

It will be seen that the quantity of silver in the water increases with the length of exposure.

Silvered commercial and laboratory rings which have become inactivated can be revived by treating with 10 per cent HCl for one hour and then thoroughly washing. It is difficult to determine whether or not this so-called oligodynamic effect is metallic in nature or due to traces of soluble salts or oxides on the surface. Hydrogen ion concentration was not a factor after this treatment.

The effect of light on silver plated

laboratory rings was studied at room temperature. Two dishes with 1 layer of rings were prepared. One was kept in a dark room and 1 in daylight, but away from direct sunlight. The temperature, bacterial count, condition of rings and method of sampling were as nearly identical as possible. It was found that the rings were not as active in the light as in the dark. The difference in time necessary to sterilize a *B. coli* suspension varied considerably, and was found to be as much as one hour longer for those rings kept in the light. Unfortunately, rate curves were not prepared. It was quite evident that there is some photo-effect which needs further study.

When comparisons were made between sterile raw water and sterile distilled water to which was added a filtered 24 hour culture of *B. coli* to approximate 1 million per c.c., the organisms suspended in distilled water were killed or rendered inactive more quickly by silver plated rings than those in raw water. This indicates that the nature of the water treated markedly affects the results. That this difference was not due to distilled water against raw water is shown by the normal death rate of *B. coli* suspended in distilled water (Figure 1).

Several experiments were conducted in an attempt to determine whether or not the organisms are actually killed by exposure to silver. Thus far it has not been possible to obtain any definite evidence of revival, although doubtful results were obtained in one test. Further work is indicated in light of the reported revival of organisms exposed to copper.

Sterile distilled water was exposed to silvered laboratory porcelain rings for several hours, removed and its action against *B. coli* determined. It was found that it had acquired considerable sterilizing effect, as would be expected from the spectrographic determination

of the silver content of exposed water (*vide supra*).

#### SILVER NITRATE

The action of silver nitrate was also studied. The dilutions are expressed on the basis of the silver ion-content.

It was found that in a dilution of 1 in a million silver nitrate sterilized water containing a million and a quarter *B. coli* per c.c. in less than  $\frac{1}{2}$  hour, while a 1 in 10 million required  $1\frac{1}{2}$  to 2 hours at  $22^{\circ}$  C. and  $2\frac{1}{2}$  to 3 hours at  $8^{\circ}$  C. The effect of temperature on the action of silver nitrate on *B. coli* is not as great as in the case of either the silvered rings or colloidal silver. It was noted, strangely enough, that 0.1 per cent normal horse serum seemed to increase the rate of action.

The effect of light was also studied but no difference could be noted between experiments conducted in the dark and those conducted in the light.

Another series of interesting experiments was conducted with silver nitrate. Tubes of lactose broth were prepared with a 1 in 100,000 concentration of silver nitrate. A definite number of organisms was added to each tube and incubated at  $37^{\circ}$  C. No growth was obtained in any tube inoculated with less than 200,000 *B. coli*, while all inoculated with 200,000 or more grew. A concentration of 1:10,000  $\text{AgNO}_3$  prevents growth in a tube inoculated with 100 million *B. coli*. A set of tubes was prepared with 1:100,000 silver nitrate and allowed to stand at incubator temperature for 48 hours and at room temperature for ten days. They were then inoculated with varying numbers of *B. coli*. A control set without silver nitrate was inoculated with a similar number of *B. coli*. All of the control tubes showed growth within 24 hours. Those which had silver nitrate added, and were inoculated with 200 or more showed excellent growth, but growth was prevented when only 20 *B.*

*coli* were used. The difference noted between this experiment and the first one described suggests that the combination of  $\text{AgNO}_3$  with something in this broth results in inactivation.

#### COLLOIDAL SILVER

The action of silver sols on bacteria has been studied by Marshall.<sup>3</sup> He reported that silver nitrate was more active than silver sols, *i.e.*, that silver nitrate calculated as 1 part of silver in 3,200,000 killed *B. typhosus* in 10 minutes, whereas a silver sol containing 1 part silver in 25,000 failed to kill in 15 minutes, but killed in 30 minutes. Marshall used Bredig's method, which produces particles of various sizes, most of which are so large that they readily precipitate. In this research a new electric dispersion method described by Fraser and Gibbard<sup>4</sup> was used, by which a clear, yellow, silver sol was prepared. It was found that the concentration of silver in an effective silver sol was of the same order as the concentration of silver as silver nitrate, producing similar results. In addition, the concentration of silver in water exposed to silvered commercial rings or silver plated rings was also of the same order. A concentration of silver (colloidal silver) of one in 10 million in distilled water produces sterility in  $3\frac{1}{2}$  hours at  $23^{\circ}$  C., and in 6 hours at  $8^{\circ}$  C. It was found that the action of colloidal silver on *B. coli* is affected by the presence of organic matter and temperature of exposure.

It is believed, therefore, that colloidal silver has an inhibitory or oligodynamic action similar to that of silvered commercial rings, or silver plated porcelain.

#### SILVER CHLORIDE AND FUSED SILVER CHLORIDE (HORN SILVER)

The effect of silver chloride was studied in a few experiments, with results similar to those obtained with

silver nitrate. A concentration of 1 part of  $\text{AgCl}$  in a million parts of distilled water sterilized a million *B. coli* per c.c. in  $2\frac{1}{2}$  hours.

Horn silver, or fused silver chloride, had a more rapid action, producing sterility in  $\frac{1}{2}$  to  $\frac{3}{4}$  of an hour. However, quantitative determinations of the solubility of fused silver chloride were not made; consequently the results are not quite comparable.

#### METALLIC SILVER

The action of metallic silver in agar plates heavily seeded with *B. coli* was studied.

Pure sheet silver was obtained (99.98 per cent pure); a small strip as first obtained was placed in an agar plate. A zone of inhibition  $\frac{1}{4}$  inch wide surrounded the silver after 24 hours' incubation. Another experiment was set up in which strips  $\frac{1}{4}$  inch wide and 1 inch long were used. One strip was cleaned by fine emery paper, another was heated to a red heat in a bunsen flame and a third was held above the tip of the flame for about one minute. Neither the cleaned silver nor that heated to redness gave any zone of inhibition, while one held over the flame gave a zone of inhibition at least  $\frac{1}{4}$  inch wide. The inference is, of course, that the inhibitory or oligodynamic action on *B. coli* is due entirely to traces of salts, oxides or sulphides on the surface.

After some days a plate which had shown a zone of inhibition was seen to have colonies growing in the clear zone. It is suggested that there is a distinct possibility of developing silver-resistant strains of *B. coli*. This point has not been studied, but will be kept in mind in future work.

#### MISCELLANEOUS EXPERIMENTS

*One.* A number of flasks and beakers, some of which were etched with hydrofluoric acid, were plated with

silver by the same chemical reduction process used for plating the porcelain. It was found that quite good oligodynamic action was secured. The rate of action was definitely co-related with the ratio between the capacity of the beaker and its wall area. The narrower the ratio between surface and volume the more quickly were the organisms affected. The suspension contained 700,000 *B. coli* per c.c. The experiment was conducted at room temperature. The main objection to this process from a practical point of view is that the silver plating on polished or etched glass did not adhere under the usual washing and cleansing conditions with soap and water.

*Two.* Double distilled water exposed to silver plated laboratory rings forty hours was boiled down from 500 c.c. to 10 c.c. and immediately diluted to 500 c.c. A suspension of *B. coli* was added to give a count of approximately 2 million per c.c. In addition, two control experiments were conducted with water exposed to silver which had not been boiled. The test was conducted at  $22^{\circ}\text{C}$ . It was found that while *B. coli* failed to grow after six hours' exposure to the control "silver" water, excellent growth was obtained after 24 hours' exposure to the boiled "silver" water.

#### SUMMARY

1. Distilled water suspensions of *B. coli* are apparently killed by exposure to silvered porcelain rings, without affecting color, odor or taste of the water.

2. There is a very definite time factor for silvered commercial rings and silvered laboratory rings to affect *B. coli* even under optimum conditions.

3. Although definite evidence of revival of organisms exposed to silver has not been obtained, further investigation is necessary before any final conclusion can be made.

4. The quantity of silver in water ex-

posed to silvered commercial rings, or to silver plated laboratory rings increases with the time of exposure, introducing another variable factor.

5. The presence of organic matter markedly increases the time of exposure necessary to prevent subsequent growth of *B. coli*.

6. The temperature of exposure markedly affects the rate of action of silvered rings, the sterilizing time increasing with lowered temperatures.

7. Rings which become inactive may be reactivated by treating with dilute HCl.

8. Silvered laboratory rings are more active in the dark than in the light.

9. Water which contains silver after exposure to silver plated porcelain has, as would be expected, the ability to inactivate *B. coli* added to it.

10. The effect of light on the action of silver nitrate on *B. coli* was studied, but it was found that under the most carefully controlled conditions there was no difference.

11. The concentration of silver in water exposed to silvered rings which is effective against *B. coli* is of a similar order as the effective concentration of silver in a silver nitrate or silver chloride solution and colloidal silver.

12. In general those factors which

affect the so-called oligodynamic effect of silver metal also affect the action of the other forms of silver studied.

#### CONCLUSIONS

It may be concluded, as a result of these laboratory studies, that although the application of the oligodynamic action of metallic silver to the treatment of water has some points of considerable interest, it cannot at the present time be recommended for practical use. Temperature, organic and inorganic constituents definitely influence the "oligodynamic" action of silver toward *B. coli* to a degree which renders the results unsatisfactory for practical application.

Furthermore, the definite, rather prolonged time factor which markedly increases under unfavorable conditions, necessitates constant and careful bacteriological control. The lack of a simple, delicate test for silver would require water to be stored until a bacteriological analysis could be completed.

#### REFERENCES

1. Suckling, E. V. *Water & Water Eng.*, Dec. 21, 1931.
2. *Ibid.*, Jan. 20, 1932.
3. Marshall, C. R. *Proc. Roy. Soc. Edinburgh*, 39:143, 1919.
4. Fraser and Gibbard. *Canad. J. Res.*, VII:133, 1932.

### Members and Fellows of the A.P.H.A.

### WHY PAY ANNUAL DUES?

IF you dislike the bother of paying membership or Fellowship dues each year, or

IF you are one of those absent-minded people who have to be reminded again and again of unpaid dues,

IF you are thrifty, Then you should apply for

### LIFE MEMBERSHIP in the A.P.H.A.

Write to the Committee on Fellowship and Membership of the American Public Health Association for information regarding this form of membership.

# A Study of the Opsono-Cytophagic Power of the Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man\*

I. FOREST HUDDLESON, HOWARD W. JOHNSON  
AND E. E. HAMANN

*Central Brucella Station, Bacteriological Section, Michigan State  
Experiment Station, East Lansing, Mich.*

IN a series of studies which the writers have been conducting for the past two years, in connection with the phenomenon of phagocytosis and allergic reactions in Brucella infection in man and animals, evidence has been obtained to the effect that one of the most important indications of infection with, and immunity to, Brucella in man is the phagocytic response of the blood, based on measurements made *in vitro* in an opsono-cytophagic system and the existence of a state of allergy as determined by an allergic skin test.

Since the widespread occurrence of undulant fever in man in the United States was established, considerable attention has been given to the diagnosis of the disease, chiefly by cultural, serological and allergic methods. There are being accumulated data which indicate that the methods of diagnosis just mentioned are not always satisfactory in detecting many cases of the disease in man. Again, there are times when the results of the serological or allergic tests are misleading which in turn may result in an incorrect diagnosis.

Many physicians often observe the occurrence of a symptom-complex in patients not unlike that of acute or chronic undulant fever. One may be confused in making a diagnosis because, if Brucella infection is suspected, it might easily be ruled out on the basis of a negative blood, stool and urine culture, and negative agglutination test. If in addition to these examinations an intradermal test is performed with a suitable agent and a positive reaction is obtained, this evidence alone is not sufficient to warrant a diagnosis of undulant fever. The diagnosis remains uncertain because all individuals who have been infected with Brucella as well as those who are actively infected will show an allergic skin reaction to a satisfactory Brucella allergin.

Confusion may again arise when individuals who are ill or who are apparently healthy are found to have Brucella agglutinins in their blood serum. Those comprising this group are chiefly laboratory workers, practising veterinarians, farmers and packing house employees. By way of illustration let us consider the status of practising veterinarians toward the disease. Those who are engaged in cattle practice come in contact with *Br.*

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.

*abortus* to a greater extent than any other single group of people. It has already been shown by serological and intradermal tests made on veterinarians in Europe and this country, that a considerable percentage have *Brucella* agglutinins in varying degrees in their blood and give a positive intradermal test. While very few of them give a history of having a clinical course of the disease, many report the occurrence of skin eruptions and malaise after removing retained placentas from aborting cows. The malaise is usually characterized by dullness, head-ache, sweating, aching in the muscles and joints. There may occur an elevation of the temperature. These symptoms may also occur from the ingestion or inhalation of the organism alive or dead, or of sterile broth filtrates on which the organism has grown. It is necessary, of course, that these materials pass through the epithelium of the skin, or the respiratory or digestive tract. Individuals in the general population as well as those in particular groups may show the symptoms just mentioned when exposed to *Brucella*.

We have conclusive evidence that all of those individuals who recover from *Brucella* infection, be it clinical or sub-clinical, are left sensitive and in some cases hypersensitive to *Brucella*, perhaps for several years. Such individuals show not only a local reaction to the intradermal test when made, but may show symptoms exactly like those seen in typical undulant fever as well. The differentiation of such cases from active infection with *Brucella*, or from many other diseases characterized by similar symptoms, has been a difficult problem to the clinician.

In attempting to arrive at a satisfactory method of detecting *Brucella* infection in those who do not show agglutinins in their blood and of clarifying the status of those individuals who show symptoms characteristic of

the disease when exposed to *Brucella* or to protein fractions of the organism, it was thought that a study of the phagocytic power of the blood in conjunction with an allergic skin test might possibly furnish considerable information on these problems and clarify the diagnosis of *Brucella* infection in many cases.

The literature is rather extensive on the phenomenon of phagocytosis and its meaning with respect to infection and immunity in other bacterial diseases. The application of allergic skin tests in detecting *Brucella* infection has also been given considerable study by many workers. Space does not permit at this time a review of the literature on all the important accomplishments in these directions.

Definite evidence was obtained during the course of these studies to support the view held by many others that a more accurate determination of an individual's actual phagocytic response to bacterial invasion may be gained by the use of whole blood, rather than by using the serum plus washed leucocytes of another individual or species of animal. In view of this fact the whole blood method was adopted for determining phagocytic response in *Brucella* infection and immunity in man in preference to the commonly used Wright and Douglas<sup>1</sup> opsonic index method.

Shortly after beginning this study we were surprised to find that the polymorphonuclear cells in whole defibrinated blood of many adults, regardless of their history as respects *Brucella* infection, show a decidedly marked ingestion of any of the three species of *Brucella in vitro* in a phagocytic system. Later it was found that when a certain amount of sodium citrate is added to a given specimen of whole blood, phagocytosis of *Brucella* is either inhibited, retarded or unaffected. The degree of phagocytosis that obtains



depends upon the history of the individual as respects *Brucella* infection. Hektoen and Ruediger<sup>2</sup> many years ago found that a great many other salts as well as sodium citrate, when added to whole blood in low concentrations, will retard or inhibit phagocytosis of certain bacteria. They succeeded in showing that the salts affected the opsonic property of the serum rather than the activity of the leucocytes.

We have found that the concentration of sodium citrate that is necessary to inhibit phagocytosis in whole blood varies with different species of animals. That is, a certain concentration of sodium citrate in the blood from one species of animal may prevent phagocytosis of *Brucella* altogether, but may not have the same degree of inhibiting action when added to the blood of another species of animal. By taking advantage of the inhibiting action of sodium citrate on phagocytosis, and applying it to a study of the opsono-cytophagic power of the blood of humans as respects *Brucella*, we find a marked difference in the opsono-cytophagic activity of the blood from the susceptible, from the infected and from the immune. In other words, one can measure an individual's status with respect to *Brucella* infection by determining the opsono-cytophagic power of the whole citrated blood *in vitro* for *Brucella*.

The concentration of sodium citrate in whole blood which has thus far given the most favorable results in determining gradations or degrees of phagocytic response toward *Brucella* sufficient for differentiating between the susceptible, the infected, and the immune is 0.8 per cent. If the concentration of sodium citrate in the blood is varied from the stated amount, differentiation between the three groups is not obtained.

In determining the phagocytic activity of whole blood, Glynn and Cox<sup>3</sup> coined

the word "opsono-cytophagic" to indicate the phagocytic activity of blood in the presence of serum opsonins and homologous leucocytes. This expression has been adopted to describe the phenomenon with which this study deals. A description of the technic that has been employed and the results of the study follow.

#### METHODS OF STUDY

*Determination of Opsono-Cytophagic Power of Blood.* The method which we have adopted for determining the opsono-cytophagic power of blood for *Brucella* is a modification of the Leishman<sup>4</sup>-Veitch<sup>5</sup> technic. The modified technic consists of mixing equal quantities of a citrated (0.8 per cent) fresh blood and a heavy bacterial suspension of living organisms in small Wassermann tubes, incubating at 37° C. for 30 minutes, and subsequently making spreads and staining with Hastings stain. The addition of a definite amount of sodium citrate prevents clotting of the blood and inhibits the action of *Brucella* opsonins which are present in the serum of many normal individuals.

*Preparation of Blood Specimen.* The blood specimens on which the test is to be made are collected in 5 c.c. amounts in glass vials in which has been placed 0.2 c.c. of a 20 per cent solution of sodium citrate in physiological salt solution. The final dilution of sodium citrate that obtains in the blood is 0.8 per cent. The test should be conducted on the specimens within six hours after collection provided they are kept in a cool place. The polymorphonuclear cells in blood disintegrate very rapidly when it is kept warm for two or three hours. The specimens should be thoroughly shaken directly before mixing with the bacterial suspension.

*Bacterial Suspension.* The bacterial suspension is prepared fresh each day by suspending several loopfuls of the

growth from a 48 hour liver agar slant culture in sterile physiological salt solution of pH 7. The turbidity of the suspension should give a reading of approximately 2 cm. when measured with the Gates apparatus.<sup>6</sup> Suspensions of any of the three species of *Brucella* are suitable regardless of virulence.

*The Test.* Into clean small glass vials, such as are used for the agglutination or Kahn test, are placed 0.1 c.c. of the whole blood and 0.1 c.c. of the bacterial suspension. After mixing thoroughly, the vials are placed in an incubator for 30 minutes at 37° C. Certain strains of *Brucella* tend to become "fast" to ingestion by the cells after being transferred daily for many weeks. If a culture is being used daily for the test, it should be checked frequently for "fastness" to phagocytosis against whole citrated blood from a known immune person. Continuous agitation during the period of incubation tends to inhibit phagocytosis. Considerable sedimentation of the blood cells takes place during the incubation period. The cells should not be resuspended by shaking after the period of incubation. Directly after removing the tubes from the incubator, a small amount of the sedimented cells is removed by means of a finely drawn capillary pipette to which is attached a small rubber bulb. A drop of the cells is placed at one end of a thoroughly cleaned and polished glass slide, and drawn across the slide by placing the end edge of another slide at such an angle that the spread thins out and terminates at or near the middle. In a spread of this type, most of the leucocytes may be found near the terminating edge of the spread. The blood film should be dried as rapidly as possible to prevent shrinking of the leucocytes. Rapid drying may be obtained by placing the slides in front of a small electric fan. A small heating unit from an electric heater, if attached to the

front of the fan and operated simultaneously, will greatly increase the speed of drying.

*Staining Spreads.* The slides are placed face-upward on a suitable rack and the spreads covered with 0.5 c.c. of Hastings stain. After an exposure of 15 seconds, 1 c.c. of distilled water is added to the stain on the slide. At the end of 10 minutes, the spread is gently washed free from stain with distilled water and dried in front of an electric fan.

*Estimation of the Degree of Opsonocytophagic Activity.* The size of the organism in question and the marked degree of phagocytosis which occurs in cells from immunes has necessitated the employment of a different system of recording phagocytic activity from that which is commonly used in studies of this nature. In routine work, a total of 25 cells is counted in different sections of the spread and each cell is recorded as negative when no phagocytosis occurs, as slight when from 1 to 20 bacteria are seen in the cell, as moderate when from 21 to 40 bacteria are found in a cell, and marked when the number of bacteria in the cell is above 40. The bacteria are so numerous in those cells showing marked phagocytosis that it is impossible to count all of them. Examples of different degrees of phagocytosis of *Brucella* are shown in Plate I.

It is realized that the foregoing method of measuring degrees of phagocytosis is only approximate. It was adopted after making thousands of examinations by different methods.

*Brucella Allergic Skin Test.* The agent used in making the allergic test was developed by Hershey in our laboratory during his study of the chemistry of *Brucella*. It is a soluble nucleo-protein fraction of the three species of *Brucella* in 1-1000 dilution in slightly alkaline physiological salt solution. The test is made by injecting

*Slight**Marked**Negative**Moderate*

## PLATE I

## DEGREES OF PHAGOCYTOSIS OF BRUCELLA

about 0.1 c.c. of the fluid intracutaneously in the lateral surface of the forearm, using a 26 gauge needle. The size of the local reaction, which is characterized by a circumscribed erythema and slight edema, may vary from 1 to 2 inches in diameter and appears within 24 hours after injection. It may persist for 48 to 96 hours. There is no necrosis or sloughing of the tissue at the point of the local reaction. In the infected, the local reaction may be accompanied by a more marked manifestation of symptoms. Those that are hypersensitive will show a terrific symptomatic reaction along with the local reaction. Those that have not been sensitized to *Brucella* and who are probably susceptible to infection show no systemic reaction. Often

one sees in certain individuals an erythema, about one-half inch in diameter with no edema around the point of the injection. It has the appearance of a nonspecific reaction.

## RESULTS OF STUDY

*Results on Blood Specimens from Cases Diagnosed as Undulant Fever.* Each of the 19 cases presented in Table I has shown clinical symptoms similar to those seen in acute and chronic undulant fever before a laboratory diagnosis of the disease was made. The laboratory diagnosis was based on either a positive blood culture or on the combined results of the agglutination, allergic and opsono-cytophagic tests. In the absence of a positive blood cul-

TABLE I

OPSONO-CYTOPHAGIC POWER OF BLOOD FROM CASES DIAGNOSED AS UNDULANT FEVER

Case No.	Sex	Approximate Date of Onset		Aggl. Titer	Allergic Skin Test	Activity of Cells Number			
						Date	Ma.	Mo.	S. N.*
1	Male	12-'29		12/19/31 + 1/500	12/19/31 Pos.	12/19/31	0	8	10 7
2	Male	2-'31		4/13/31 + 1/500	None made	4/13/31	0	0	4 21
3	Female	3-'31		5/15/31 + 1/500	3/15/31 Pos.	5/15/31	0	0	10 15
4	Male	7-'31		12/ 4/31 Neg.	12/ 4/32 Pos.	12/ 4/32	0	0	0 25
5	Male	11/10/31		1/18/32 + 1/500	1/18/32 Pos.	1/18/32	0	0	5 20
6	Male	1/18/32		2/17/32 + 1/500	2/17/32 Pos.	2/17/32	6	4	15 0
7	Female	5-'30		4/ 7/32 Neg.	4/ 7/32 Pos.	4/ 7/32	0	0	0 25
8	Male	2/20/32		4/13/32 + 1/500	4/15/32 Pos.	4/15/32	0	2	3 20
9	Male	4/ 3/32		4/21/32 + 1/500	4/21/32 Pos.	4/21/32	0	0	21 4
10	Boy	3/10/32		5/15/32 + 1/500	5/15/32 Pos.	5/15/32	0	4	8 13
11	Female	5/ 1/32		5/16/32 + 1/500	5/16/32 Pos.	5/16/32	0	3	5 17
12	Male	4/10/32		5/16/32 + 1/500	5/16/32 Pos.	5/16/32	0	6	6 13
13	Male	3/20/32		5/16/32 + 1/500	5/16/32 Pos.	5/16/32	1	2	4 18
14	Male	6/ 7/32		6/ 9/32 + 1/500	6/ 9/32 Pos.	6/19/32	3	4	14 4
15	Female	6/10/32		6/24/32 + 1/500	6/24/32 Pos.	6/24/32	0	2	19 4
16	Male	6/ 1/32		6/30/32 + 1/500	6/30/32 Pos.	6/30/32	0	3	22 0
17	Female	2-'30		7/ 7/32 Neg.	7/ 1/32 Pos.	7/ 7/32	3	4	15 5
18	Girl	6/30/32		7/11/32 Neg.	7/11/32 Pos.	7/11/32	0	0	0 25
(3 yrs.)									
19	Infant	7/19/32		7/22/32 Neg.	7/22/32 Pos.	7/22/32	0	0	4 21
(17 mo.)									

\* Ma.=Marked phagocytosis  
Mo.=Moderate phagocytosis  
+=Complete agglutination

S.=Slight phagocytosis  
N.=No phagocytosis

ture and positive agglutination test, the diagnosis was made on the basis of the results of both the allergic skin test and opsono-cytophagic test. No diagnosis was based on these two tests until sufficient data were accumulated from previous studies to warrant their application to the diagnosis of undulant fever.

The laboratory tests and allergic skin test were used in the diagnosis of the disease within a few days after the onset of symptoms in a few cases, while in others the interval varied from six weeks to approximately two years.

*Brucella melitensis* was isolated from the blood of cases Nos. 3, 14 and 15. These were laboratory infections. *Brucella abortus* was isolated from the blood of cases Nos. 5, 8, 9, and 13. Blood cultures from the remaining 12 cases were negative.

It may be noted from the data presented in Table I that the opsono-cytophagic power of the blood is low or

absent in all cases with the exception of No. 6. This individual had a comparatively mild form of the disease as expressed in terms of clinical symptoms. Experience with this test has shown that the phagocytic power rises and falls during the course of the disease. If the invading organism is very active in the body, the phagocytic activity of the cells is likely to be low. On the other hand, if it is not very active, as indicated by clinical symptoms, the phagocytic activity of the cells will be found higher.

In view of the fact that many individuals, either healthy or ill, will show an allergic skin reaction to *Brucella* due to previous infection, one might question a diagnosis of undulant fever based on a positive allergic skin test and low or negative opsono-cytophagic test in a patient in the absence of a positive blood culture and negative agglutination test. We have given considerable attention to this question in our studies.

The contention that a diagnosis of undulant fever can be made on the basis of the two tests in question is supported by the data which are to follow concerning the degree of ingestion of the organism on the part of the cells in blood examined shortly after and long after recovery from the disease, as compared to that which takes place in the blood from patients during the course of the disease. Furthermore, it is supported by the fact that those cases in question respond to specific treatment with either Brucellin or Pyronin, or both, when administered simultaneously and the cells in whole citrated blood show marked phagocytosis of Brucella.

*Comparisons of the Results of Blood Examinations Made on Patients During and After Recovery from Undulant Fever.* The comparative results are illustrated in Table II on eight known cases of undulant fever. The opsono-cytophagic test was made during the disease from two days to two months after the onset. The time of making the test on each case after recovery, varied from two days to approximately one month. The evidence on which recovery from the disease is determined is the complete disappearance of all those clinical symptoms by which it is characterized.

The data clearly show that the opsono-cytophagic power of the blood is low during the disease and becomes very marked after recovery.

*Results of the Examination of Blood from Individuals Known to Have Had Undulant Fever.* In Table III are illustrated the results of the opsono-cytophagic test and agglutination test on 15 individuals after recovery from undulant fever. These cases are not included in the group in Table II. The tests were made at intervals varying from 36 days to four years after recovery from the disease.

The opsono-cytophagic power of the blood for Brucella is very marked in all cases, regardless of the length of the interval between recovery and the phagocytic examination. It is interesting to note that there is no relation between Brucella agglutination titer of the individual's serum and the ingestion capacity for Brucella of the leucocytes suspended in the serum.

All individuals whose blood shows a marked opsono-cytophagic power for Brucella *in vitro* similar to that in those cases illustrated in Table III, will also show an allergic skin reaction to the same degree as those that are infected with Brucella when tested by a satisfactory Brucella allergin. The blood of the infected, however, will not show

TABLE II  
OPSONO-CYTOPHAGIC POWER OF BLOOD OF CASES DURING AND AFTER RECOVERY  
FROM UNDULANT FEVER

Case No.	Period of Disease	Activity of Cells During Infection						Activity of Cells After Recovery					
		Date	Number					Date	Number				
			Ma.	Mo.	S.	N.*			Ma.	Mo.	S.	N.*	
1	11/10/31 to 1/30/32	1/18/32	0	0	5	20	2/ 5/32	25	0	0	0	0	
2	2-'31 to 4/20/32	4/13/32	0	0	4	21	4/23/32	23	0	2	0	0	
3	2/20/32 to 4/26/32	4/15/32	0	2	3	20	5/15/32	23	2	0	0	0	
4	3/20/32 to 5/18/32	5/15/32	0	4	8	13	6/11/32	25	0	0	0	0	
5	4/10/32 to 7/15/32	5/16/32	0	6	6	13	7/23/32	25	0	0	0	0	
6	3/20/32 to 5/26/32	5/16/32	1	2	4	18	6/11/32	19	6	0	0	0	
7	6/ 7/32 to 6/20/32	6/ 9/32	3	4	14	4	7/26/32	25	0	0	0	0	
8	6/10/32 to 7/ 5/32	6/24/32	0	2	19	4	7/ 7/32	25	0	0	0	0	

\* Ma.=Marked phagocytosis  
Mo.=Moderate phagocytosis

S.=Slight phagocytosis  
N.=No phagocytosis

TABLE III

OPSONO-CYTOPHAGIC POWER OF BLOOD OF INDIVIDUALS AFTER RECOVERY FROM UNDULANT FEVER

Case No.	Sex	Period of Disease	Activity of Cells				Agglutination	
			Date	Ma.	Mo.	S.	N.*	Test
1	Male	1-'30 to 4-'30	2/ 4/31	21	0	0	4	2/14/31 + 1/25
2	Male	12-'26 to 4-'27	4/ 1/31	25	0	0	0	4/ 1/32 + 1/25
3	Male	1-'26 to 12-'26	4/17/31	22	1	2	0	4/17/31 —
4	Male	7/ 3/30 to 7/15/30	4/17/31	22	2	0	1	4/17/31 —
5	Male	1-'28 to 4-'28	4/17/31	21	2	1	1	4/17/31 + 1/50
6	Female	5/ 5/30 to 5/25/30	4/20/31	22	0	3	0	4/20/31 + 1/25
7	Male	5-'30 to 6-'30	4/29/31	24	0	1	0	4/29/31 + 1/50
8	Female	5/ 1/32 to 5/31/32	5/31/32	25	0	0	0	7/23/32 + 1/500
9	Female	3-'31 to 5/25/31	5/31/31	25	0	0	0	5/31/31 + 1/500
10	Male	12/ 6/29 to 1/15/30	4/17/31	25	0	0	0	4/17/31 + 1/50
11	Male	4/15/30 to 6/30/30	2/ 8/32	23	2	0	0	2/ 8/32 —
12	Male	2-'29 to 4-'29	3/31/32	25	0	0	0	3/31/32 + 1/25
13	Male	1-'31 to 3-'31	7/ 7/32	25	0	0	0	7/ 7/32 + 1/25
14	Male	3-'30 to 5-'30	7/ 7/32	25	0	0	0	7/ 7/32 —
15	Male	9-'30 to 12-'30	7/ 7/32	25	0	0	0	7/ 7/32 P 1/25

\* Ma.=Marked phagocytosis  
Mo.=Moderate phagocytosis  
—=Complete agglutination

S.=Slight phagocytosis  
N.=No phagocytosis  
P=Incomplete agglutination

marked phagocytic power for *Brucella in vitro*.

*Results of the Examination of Specimens of Blood from Bacteriology Laboratory Workers.* In Table IV are presented the results of the opsonocytaphagic and agglutination test in three groups of laboratory workers; namely, those who have been working with infective material for several years, those who have never knowingly handled infective materials, and a group before and after working with infective materials. Cases No. 1 and 2 represent the latter named group. The blood of these two individuals showed no phagocytic activity for *Brucella* before working with infective materials or infected animals. At some period within four months after beginning their laboratory work, both were infected with *Brucella*, as indicated by the results of the blood examinations. There was no clinical evidence of the disease in either case.

Those that have never knowingly worked with infective materials or infected animals are Nos. 6, 10, 12, 18, 19, and 20. The remainder of the group are known to have worked with cul-

tures of the organism or infected animals. The blood of each of the latter, twelve in all, with the exception of one, shows a very marked phagocytic activity for *Brucella*.

In Table V are presented data on 17 packing house employees, to support the contention that those who are exposed constantly to *Brucella* infective materials or to *Brucella* infected animals will sooner or later become infected. The blood of these men was examined on November 11, 1931, with negative results to both the agglutination and opsonocytaphagic tests. One of the men in this particular group, engaged in the manufacture of sausages, developed clinical undulant fever in June, 1932. An examination of the blood of each, including the one, No. 17, who was showing symptoms typical of the disease on July 22, 1932, revealed valuable information pertaining to *Brucella* infection and immunity. The results of the agglutination test show that eleven had been exposed to infection; that is, the organism had passed beyond the epithelial barrier of the skin or mucous membranes. The opsono-

TABLE IV

OPSONO-CYTOPHAGIC POWER OF BLOOD OF LABORATORY WORKERS—NO HISTORY OF DISEASE

Case No.	Date	Activity of Cells				Date	Agglutination Test		History
		Ma.	Mo.	S.	N.*			Titer	
1	11/28/30	0	0	0	25	11/28/30	—	Veterinary student. 12/30 began testing blood specimens for Bang's disease	
	4/30/31	19	2	4	0	4/30/31	+ 1/25		
2	2/ 2/31	0	0	0	25	2/ 2/31	—	Graduate student. 10/31 began study of bovine mastitis	
	6/ 1/32	21	3	1	0	6/ 1/32	+ 1/50		
3	4/17/31	17	4	3	1	4/17/31	—	Veterinarian. Works with Bang's disease	
4	10/ 7/30	25	0	0	0	10/ 7/30	+1/50	Has been in veterinary practice	
5	3/31/32	11	8	6	0	3/31/32	+ 1/25	Dairy bacteriologist	
6	2/ 2/31	0	0	0	25	2/ 2/31	—	Bacteriologist — never worked with infective material	
7	2/ 4/32	25	0	0	0	2/ 4/32	—	Bacteriologist — worked with infective material 15 years ago	
8	4/17/31	22	2	1	0	4/17/31	+ 1/50	Veterinarian. Works with infective material	
9	12/31/31	25	0	0	0	12/31/31	—	Worked with infective material and cultures for 17 years	
	1/14/31	25	0	0	0	1/14/31	—		
	9/10/31	25	0	0	0	9/10/31	—		
	6/15/32	25	0	0	0	6/15/32	—		
10	11/14/30	0	0	0	25	11/14/30	—	Graduate student in bacteriology	
11	9/25/30	25	0	0	0	9/25/30	—	Bacteriologist — works with infective material	
	4/29/31	25	0	0	0	4/29/31	—		
	11/ 9/31	22	2	1	0	11/ 9/31	—		
	3/31/32	25	0	0	0	3/31/32	—		
12	2/ 2/31	0	0	2	23	2/ 2/31	—	Bacteriologist — never worked with infective material	
13	9/25/30	25	0	0	0	9/25/30	+ 1/25	Veterinary bacteriologist. Works with infected cattle	
	2/ 2/31	25	0	0	0	2/ 2/31	—		
14	4/17/31	25	0	0	0	4/17/31	—	Bacteriologist — works with infective material	
15	4/29/31	0	0	1	24	4/29/31	—	Bacteriologist	
16	4/17/31	22	1	2	0	4/17/31	—	Cares for infected experimental animals	
17	3/31/32	17	6	2	0	3/31/32	—	Washes glassware containing cultures	
18	5/11/32	0	0	0	25	5/11/32	—	Laboratory assistant — never worked with infective material	
19	5/11/32	0	0	0	25	5/11/32	—	Laboratory assistant — never worked with infective material	
20	5/11/32	0	0	0	25	5/11/32	—	Laboratory assistant — never worked with infective material	

\* See footnote to Table III.

TABLE V

OPSONO-CYTOPHAGIC POWER OF BLOOD OF A GROUP OF PACKING HOUSE EMPLOYEES BEFORE AND AFTER EXPOSURE TO BRUCELLA

Number of Employee	Examinations 11/12/31				Examinations 7/28/32				Clinical Evidence of Infection
	Aggl. Titer	Activity of Cells			Aggl. Titer	Activity of Cells			
		Ma.	Mo.	S. N.*		Ma.	Mo.	S. N.*	
1	Neg.	All cells neg.			+ 1/25	22	2	1 0	No
2	"	"	"	"	+ 1/500	4	4	17 0	Yes
3	"	"	"	"	Neg.	23	2	0 0	No
4	"	"	"	"	+ 1/100	18	7	0 0	No
5	"	"	"	"	Neg.	23	2	0 0	No
6	"	"	"	"	Neg.	0	0	0 25	No.
7	"	"	"	"	Neg.	0	0	6 19	No
8	"	"	"	"	+ 1/500	6	11	7 1	Yes
9	"	"	"	"	+ 1/500	0	3	8 14	Yes
10	"	"	"	"	+ 1/50	24	1	0 0	No
11	"	"	"	"	+ 1/500	2	11	9 3	Yes
12	"	"	"	"	+ 1/500	None made			Yes
13	"	"	"	"	Neg.	25	0	0 0	No
14	"	"	"	"	+ 1/50	22	3	0 0	No
15	"	"	"	"	Neg.	0	0	2 23	No
16	"	"	"	"	+ 1/500	None made			No
17	"	"	"	"	+ 1/500	0	16	9 0	Yes

\* Ma.=Marked phagocytosis  
Mo.=Moderate phagocytosis

S.=Slight phagocytosis  
N.=No phagocytosis

cytophagic test was conducted on all except two. The results of this test showed that all those reacting to the agglutination test and two others that were negative had been exposed to infection. The blood of those, Nos. 2, 8, 9, 11, and 17, which were showing symptoms of the disease, had low phagocytic power for *Brucella*. The phagocytic power of the cells was either marked or negative in those showing no symptoms of the disease. *Br. suis* was isolated from the blood of No. 11.

*The Results of the Examination of Blood Specimens from Large Groups of Individuals.* The groups in question were veterinarians, packing house employees, college students enrolled in bacteriology courses, hospital patients and inmates of a State Prison.

The gross results of the opsono-cytophagic test and agglutination test for *Brucella* are presented in Table VI. Most of the 20 veterinarians examined had been engaged in cattle practice. The opsono-cytophagic power of the

blood from 19 was very marked for *Brucella*. None gave a history of having clinical symptoms characteristic of undulant fever. Many of them, however, report the appearance of an erythema on their arms after removing retained placentas from aborting cows. This sign indicates hypersensitiveness to *Brucella*. The skin test is always positive in such cases.

Blood specimens were taken from 176 men and women in three packing houses and one stock yard in Michigan. Most of the men were engaged in work which necessitated the handling of fresh pork or beef. The women were employed in wrapping cured bacon for the market. The stock yard employees came in contact with live animals only. The results of the opsono-cytophagic test alone indicate that 40, or 22.7 per cent, of the employees have at some period in the past been infected with *Brucella*. Of the total examined, three were showing clinical symptoms of



TABLE VI  
OPSONO-CYTOPHAGIC POWER OF BLOOD OF GROUPS OF INDIVIDUALS

Group	Number Examined	Date of List	Opsono-Cytophagic Test			Agglutination Test	Estimated Per Cent Exposed to Brucella Infection
			Number Showing				
			All Cells Marked	Few Cells Slight	All Cells Negative		
Veterinarians	20	6/20/31	19	0	1	Titers, varied from negative to + 1/500	95
Packing House Employees	176	11/12/31	40	47	89	Titers, varied from negative to + 1/500	22.7
College Students	29	5/10/31	5	9	15	Titers, negative to incomplete 1/25	17.2
Hospital Patients	240	During 1931-32	30	45	165	Titers, varied from negative to + 1/50	12.0
Men in State Prison	133	7/22/32	14	26	97	Titers, all negative except one + 1/500	10.5

undulant fever at the time the blood specimens were collected.

The 29 college students were in two separate groups, one of which was examined about one year after the other. Of the total number examined, the blood of 5, or 17.2 per cent, showed the degree of phagocytosis observed in those who have at one time been infected with Brucella.

The hospital patients from whom

blood specimens were examined constituted a rather miscellaneous group of both males and females. They might be grouped as cases of infectious and organic disease, injuries, and blood donors from whom blood is taken for transfusion. Of the total number examined, the blood of 30, or 12 per cent, showed the degree of phagocytosis observed in those who have at one time been infected with Brucella.

TABLE VII

A. PROPOSED SYSTEM FOR THE DIAGNOSIS OF UNDULANT FEVER ACCORDING TO RESULTS OF THE AGGLUTINATION, ALLERGIC AND OPSONO-CYTOPHAGIC TESTS

Agglutination Test	Allergic Skin Test	Opsonophagic Power of Blood	Status Toward Brucella
—	—	Cells negative to 20 per cent slight	Susceptible
—	+	Cells negative to 40 per cent marked	Infected
—	+	Cells 60 to 100 per cent marked	Immune
+	+	Cells 60 to 100 per cent marked	Immune
+	+	Cells negative to 40 per cent marked	Infected

The prison inmates examined were of two groups, namely, kitchen personnel and patients in the tuberculosis hospital. The latter group may be divided into diagnosed cases and suspects. Of those examined, the blood of 14 or 10.5 per cent, showed a marked degree of phagocytosis for *Brucella*. These men came from all walks of life and should represent a cross section of what one would expect to find from an examination of the blood of the general population. Patients examined in the hospitals and students also represent a cross section of the general population.

#### DISCUSSION

We present data on an opsonocytophagic study of the whole citrated blood of humans with respect to *Brucella* infections. A technic for testing the opsono-phagocytic power of the whole blood and a reagent and procedure for making a satisfactory allergic skin test are described. The two tests should be made simultaneously in determining the status of an individual as respects *Brucella* infection. The data have furnished a basis for measuring susceptibility, infection and immunity to *Brucella* infection.

The advantage of using whole blood in such studies has been pointed out by Shattock and Dudgeon,<sup>7</sup> Hektoen<sup>8</sup> and many others. The addition of sodium citrate to the blood serves a twofold purpose, namely, to prevent clotting and partially or totally to reduce the opsonic property of the serum in order to ascertain variations in the phagocytic power of the blood.

The basis for the assertion that the measurement *in vitro* of the opsonocytophagic power of whole citrate blood of humans in conjunction with the determination of skin allergy for *Brucella*, will determine susceptibility and immunity to, as well as infection with *Brucella*, rests upon the data which we have gathered. Although our data with

respect to phagocytic activity of the blood in *Brucella* infection in man is new, it might be said here that many investigators have collected similar data from the study of other infectious diseases of man and animals. The interpretations which they have given to their results differ somewhat from those placed on our own. For example, a continuous high phagocytic power of the blood for an organism has been interpreted as meaning a "carrier state," by certain workers. Ledingham,<sup>9</sup> Gaechtens,<sup>10</sup> Hamilton,<sup>11</sup> and others have observed that sera of typhoid carriers invariably show a high opsonic index when compared with the normal individual. Such findings have been considered useful in detecting the typhoid carrier. If the high phagocytic power of the blood seen in those who recover from undulant fever as well as many other individuals who give no history of the clinical manifestations of the disease, is taken as evidence of a carrier state as it is in typhoid, then there is a large group of individuals in this country who are constantly carrying *Brucella* in some part of their body. The data that we have accumulated on blood specimens from humans do not indicate that a continuous high phagocytosis for *Brucella* signifies a carrier state.

The observations which we have made over a period of years on the value of the intradermal test for detecting *Brucella* infection in humans convince us that a positive reaction does not necessarily mean active infection. A positive reaction signifies sensitization to *Brucella*. If a positive skin reaction is obtained in doubtful cases of undulant fever, the positive reaction does not have specific significance until a determination of the opsono-cytophagic power of the whole blood is made. The latter test should be made at the same time or before the skin test is performed.

In order that the interpretation of the combined agglutination, opsonocytophagic and allergic tests may be clarified as respects the status of a given individual toward *Brucella* infection, we are proposing a system of diagnosis according to the combined results of the three tests. The proposed system is arranged in Table VII.

In any study which concerns the phenomenon of phagocytosis there always appear many problems and questions that need solving and answering. We have studied at considerable length the factors involved in bringing about the phagocytosis of *Brucella* in human blood and blood from other species of animals as well. We have also made some very interesting observations on the opsonocytophagic power of the cord blood from infants and blood from new born calves before and after the ingestion of colostrum. These studies together with a considerable number of other observations will appear in a forthcoming paper.

#### SUMMARY

The studies which we have conducted on citrated blood of humans who were known to have had undulant fever in past years and shortly after recovery, who are actively infected, or who have no history of the disease, show that the *in vitro* activity of the polymorphonuclear cells in whole citrate blood for *Brucella* is an expression of immunity to *Brucella* and an indication of the progress toward recovery in active infection. The ab-

sence of or a low phagocytic activity obtained in conjunction with a negative allergic skin test is evidence of susceptibility to *Brucella* infection. Infection in an individual is indicated by a positive allergic skin test obtained with *Brucella* nucleo-protein in conjunction with negative or low opsonocytophagic activity of the whole citrated blood for *Brucella*.

#### REFERENCES

1. Wright, A. E., Douglas Netley and Steward R. Rôle of the blood fluids in phagocytosis. *Proc., Royal Society, London*, 72:357, 1904.
2. Hektoen, L., and Ruediger, G. F. Studies in phagocytosis. *J. Infect. Dis.*, 2:128, 1905.
3. Glynn, Ernest E., and Cox, G. Lissant. Variations in the inherent phagocytic power of leucocytes. *J. Path. & Bact.*, 14:90, 1910.
4. Leishman, W. B. Studies on phagocytosis. *Trans., Pathological Soc., London*, 56:344, 1905.
5. Veitch, Robt. M'Leod. A simple and rapid method of estimating the phagocytic power of different bloods. *J. Path. & Bact.*, 12:353, 1908.
6. Gates, Frederick L. A method of standardizing bacterial suspensions. *J. Exper. Med.*, xxxi:105, 1920.
7. Shattock, S. G., and Dudgeon, L. S. Observations upon phagocytosis carried out by means of melanin to ascertain more particularly whether the opsonic index is identical with the hemophagocytic index. *Proc., Royal Society, London, Series B*, 80:165, 1908.
8. Hektoen, Ludvig. Variations in the Phagocytic and other powers of Leucocytes. *J.A.M.A.*, 57:1579, 1911.
9. Ledingham, J. G. The typhoid carrier problem with some experiments in immunity in carriers. *Brit. M. J.*, 2:1173, 1908.
10. Gaetgens, Walter. Ueber Opsoninuntersuchungen bei Typhus-bazillenträgern. *Dtsch. medizinische Wochenschrift*, 35:1337, 1909.
11. Hamilton, Alice. The Value of Opsonin Determinations in the Discovery of Typhoid Carriers. *J. Infect. Dis.*, 7:393, 1910.

NOTE: Journal Article Number 125 (N.S.) from the Michigan State Experiment Station. This study was partly financed by a grant from the Abortion Committee of the National Research Council and the Commonwealth Fund.

# Toxicity of Organic Fluorides\*

WILLIAM P. YANT

*Supervising Chemist, Health Laboratory Section, Pittsburgh Experiment Station,  
U. S. Bureau of Mines, Pittsburgh, Pa.*

THIS paper presents a résumé of the toxicological properties of two compounds — namely, dichlorodifluoromethane and dichlorotetrafluoroethane — that have been developed in the course of a search for safe refrigerants.<sup>1</sup> The toxicological investigation was made by the Bureau of Mines with the coöperation of the Frigidaire Corporation, the Bureau of Mines interest being inherent in the problem of safety in conditioning the air of mines where the high temperature and humidity present an unhealthy environment for workmen and in some cases are an impediment if not a barrier to mining operations.

At the present time there is much interest in and endeavor toward increasing health and safety in domestic and industrial refrigeration. The effort is aimed not only at betterment of present appliances and the solution of present problems but also at the solution of problems which are anticipated in the extension of refrigeration, particularly for conditioning the air of homes, public buildings, and working places. In some instances the endeavor is directed toward safer means for using a product that is potentially or has been in fact a source of trouble, as: better mechanical construction; means for apprising persons of leakage; using refrigerants that permit lower operating pressures, possibly even below atmospheric pressure; limiting the quantities of refrigerating media used and hence the

potential magnitude of exposure of persons; and regulations pertinent to the installation of the devices. In other instances the endeavor has been not only to prevent exposure but also to develop refrigerating media of a safer nature.

## PHYSICAL AND CHEMICAL PROPERTIES<sup>2</sup>

Dichlorodifluoromethane<sup>2</sup> ( $\text{CCl}_2\text{F}_2$ ) at room temperatures and pressures is a heavy, colorless gas that possesses a chloroform-carbon-tetrachloride-like odor.\* The boiling point is  $-29.8^\circ\text{C}$ .; density of liquid, 1.35 gm. per c.c. at  $13.8^\circ\text{C}$ .; specific gravity of gas (air = 1), approximately 4.2; vapor pressure in atmospheres, 3.045, 5.592, and 11.99 at  $0^\circ$ ,  $20^\circ$ , and  $50^\circ\text{C}$ ., respectively. It is non-flammable, non-corrosive, and neutral. Solubility is estimated as 0.03 gm. in 100 gm. of water. The operating pressures of refrigerating devices using this compound would be in the general range of those for sulphur dioxide and methyl chloride.

Dichlorotetrafluoroethane<sup>2</sup> ( $\text{C}_2\text{Cl}_2\text{F}_4$ ) at room temperatures is a heavy, colorless gas that possesses a sweet chloroform-like odor.\* The boiling point is  $3.6^\circ\text{C}$ .; density 1.4 gm. per c.c. at  $15^\circ\text{C}$ .; specific gravity of gas (air = 1), approximately 5.9. It is non-flammable, non-corrosive, and neutral. Solubility is estimated as 0.1 gm.

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.

\* As this work was performed while these products were in the semi-commercial stage of production, the products may have contained traces of impurities which contributed to the odor.

in 100 gm. of water. The physical properties of this compound permit its use in refrigerating appliances designed for operation at nearly atmospheric pressure, thereby minimizing the possibility of leakage.

#### EXPERIMENTAL PROCEDURE AND APPARATUS

The reader is referred to progress reports on the toxicity of these compounds<sup>3,4</sup> for a detailed description of the test equipment and procedure. It may be briefly stated here that the experiments were conducted under carefully controlled conditions. The concentration of vapor was recorded continuously during all experiments by means of a thermal conductivity gas-analysis apparatus, and the oxygen and carbon dioxide content was ascertained by volumetric gas analysis procedures. Control animals were simultaneously exposed to identical conditions except that the air lacked the vapor.

#### RESPONSE OF ANIMALS TO DICHLORODIFLUOROMETHANE

##### *Repeated Exposure of 7 to 8 Hours Daily to 20 Per cent CCl<sub>2</sub>F<sub>2</sub> in Air—*

Dogs and monkeys\* were exposed to air containing 20 per cent by volume of CCl<sub>2</sub>F<sub>2</sub> for 7 to 8 hours daily on five days, and for 4 hours on the sixth day of each week during a 12-week period. This exposure produced mild to moderate to marked generalized tremor in dogs, and mild to moderate generalized tremor in monkeys. The tremor was recurring and cyclic, each cycle ranging from a fine tremor when the animal was quiet to a marked coarse tremor, often convulsive, when there was attempted activity. When the animals, particularly the dogs, attempted to walk, they

acted very much like persons suffering from alcoholic ataxia. They reacted to light and stimuli, and did not become unconscious. The maximum severity of symptoms was reached in the first 10 to 20 minutes of an 8-hour exposure. The symptoms practically disappeared in 1 minute and completely disappeared in 10 minutes after removal from the test environment. In most instances the animals ate food offered to them during exposure and always had good appetites in 5 to 10 minutes following a daily exposure period. A tolerance was developed with successive daily exposures. This was manifested by a marked decrease in severity of the symptoms. No fatalities occurred.

The number of red blood cells and the hemoglobin content increased slightly during the first two or three weeks of the series of exposures but thereafter was normal and similar to control animals. There was also a slight increase in the polymorphonuclear neutrophils with a slight decrease in lymphocytes.

Autopsies performed on all animals revealed no gross pathology attributable to the exposure to dichlorodifluoromethane.

The persons that performed these experiments were momentarily exposed on many occasions to the experimental environment. It produced distinct eye irritation and immediate symptoms of vertigo. These symptoms disappeared in a minute or two after exposure. The character of the atmospheres is such that persons would not voluntarily tolerate it.

*Continuous Exposure (24 Hours Daily) to 20 Per cent CCl<sub>2</sub>F<sub>2</sub> in Air—*Monkeys exhibited signs of irritation of the eyes and slight incoördination during the first 9 to 14 hours and were, in general, sluggish and drowsy with incoördination after 18 hours, though at times they became very alert and active. The periods of activity were followed

\* Guinea pigs were also used in this study, but owing to the desirability of condensing this paper the results are confined to those obtained on dogs and monkeys. The work with guinea pigs has been described in previous publications.<sup>3,4</sup>

by periods of marked sluggishness and drowsiness. This condition prevailed without occurrence of unconsciousness during continuous exposure periods up to 121 hours and 24 minutes. No deaths occurred during or following these exposures. Gross autopsy findings were slight congestion, particularly in the lungs, and appearance of slight fatty degeneration of the liver.

A dog exhibited signs of irritation of the eyes, generalized tremor and marked incoördination in a few minutes, and incoördination to the point of falling after an hour and 20 minute exposure. Tremors increased in severity during the following three hours, and at times there was a pronounced jerking of the head. Also during this time unsuccessful attempts were made to stand. However, following these observations the animal began to show tolerance; the tremors were less severe, the dog was able to stand, and he ate food. The remainder of a continuous 121 hour and 24 minute exposure was characterized by signs of weakness and somnolence with periods of apparent normalcy. After termination of exposure the symptoms abated in a few minutes. This animal was observed for 28 days following termination of exposure and then killed for autopsy while in an apparently healthy condition. Gross autopsy findings were signs of a previous irritation of the lungs and the liver was pale; otherwise the organs appeared normal.

#### EXPERIMENTS WITH DICHLOROTETRA- FLUOROETHANE ( $C_2Cl_2F_4$ )

The experiments with dichlorotetrafluoroethane ( $C_2Cl_2F_4$ ) were performed in the same apparatus and according to the same technic as those with dichlorodifluoromethane.

*Exposure to 20 Per Cent  $C_2Cl_2F_4$  in Air*—In general the symptoms were very similar to those produced by

dichlorodifluoromethane. Exposure of dogs to 20 per cent vapor caused immediate and continued marked generalized tremors and recurring convulsions with periods of relaxation and exhaustion. Recovery was rapid and complete after a single 8-hour period; death occurred in seven days following a single exposure of 16 hours, and in three days following a single exposure of 24 hours.

Repeated exposures of eight hours daily produced immediate marked generalized tremors and convulsions, and death after 3 to 4 daily periods.

The number of red blood cells, hemoglobin and the younger forms of polymorphonuclear leucocytes invariably increased in the general order of the severity of the exposure. There was usually a slight to moderate decrease in platelets. Other blood findings were of no particular significance. A tendency toward a slight increase in red blood cells, hemoglobin and the younger forms of polymorphonuclear leucocytes was also noted in the control dogs, but this change was slight in comparison to that observed in the exposed animals. The changes observed in the blood counts of the exposed dogs, although possibly influenced by the decrease in oxygen, caused by dilution of the air with the dichlorotetrafluoroethane vapor, were undoubtedly due to some extent to  $C_2Cl_2F_4$ .

Congestion throughout all of the organs was the most definite gross pathological finding in all dogs that died. This was particularly noted in the lungs with areas of hemorrhage, and in the gastrointestinal tract.

*Exposure to Approximately 15 Per Cent  $C_2Cl_2F_4$  in Air*—In view of the fact that the response to 20 per cent  $C_2Cl_2F_4$  was more severe than the response to a similar volume concentration of  $CCl_2F_2$ , the concentration used for succeeding experiments was 14.16 to 15 per cent vapor by volume. On a

weight basis a 14.16 volume concentration of  $C_2Cl_2F_4$  is equivalent to a 20.0 per cent. by volume concentration of  $CCl_2F_2$ . Also the fluorine present (by weight) is equal in these comparative volume concentrations.

Exposure to 14.16 or 15 per cent vapor in air caused moderate to marked incoördination with generalized tremors in dogs, and occasional convulsions, the symptoms again being similar to those previously described for  $CCl_2F_2$ . After three to five consecutive 8-hour daily exposures to 14.16 per cent a tolerance gradually developed, convulsions disappeared and tremors became finer or disappeared entirely. There was a slight loss of appetite and weight during the first five days of exposure but this was regained with succeeding exposures and was maintained. No deaths occurred during 21 consecutive exposures or during a 15- and 17-day post-exposure observation period. Exposures to 15 per cent vapor in air for a single period of 16 or 24 hours caused temporary loss of appetite but no deleterious effects of a permanent nature were observed.

Eight-hour exposures for 21 consecutive days produced a slight gradual increase in hemoglobin and red blood cells. This returned to normal in 15 to 17 days after exposure. The younger forms of polymorphonuclear leucocytes increased during the first week of exposure but returned to normal with succeeding exposures. There was a slight decrease in platelets in one animal during the first part of the series but they returned to a normal number with succeeding exposures; the other dog showed no change in platelets.

No gross pathology was found in dogs repeatedly exposed 8 hours daily for 21 consecutive days; a slight congestion of the gastrointestinal tract was found in a dog continuously exposed for 24 hours to 15 per cent of gas, and a gastroenteritis in a dog continuously

exposed for 16 hours to 15 per cent. This was at first thought to be due possibly to secretion of dichlorotetrafluoroethane into the gastrointestinal tract, but on further consideration it appeared that the recurring convulsions that accompanied exposure were a more logical cause.

#### DISCUSSION OF TOXICITY OF ORGANIC FLUORIDES IN RELATION TO FUNDAMENTAL TOXICOLOGY

Aside from the primary interest of enhancing safety in refrigeration and air conditioning, these organic fluorides are very interesting from the viewpoint of fundamental toxicology. On the basis of former knowledge of the physiological response to volatile halogen derivatives of aliphatic hydrocarbons, as methyl chloride ( $CH_3Cl$ ), chloroform ( $CHCl_3$ ), carbon tetrachloride ( $CCl_4$ ), and tetrachloroethane ( $C_2H_2Cl_4$ ), and the comparative toxicity of inorganic chlorides and fluorides, it would generally be expected that the substitution of fluorine atoms for hydrogen or in part for chlorine atoms in the molecule would increase the toxicity. However, a comparison of the observed response to dichlorodifluoromethane ( $CCl_2F_2$ ) and dichlorotetrafluoroethane ( $C_2Cl_2F_4$ ) with response to the previously mentioned compounds will show that the response to these fluorine-containing derivatives on the basis of concentrations in the air by volume is phenomenally less than would be expected. The effective concentrations are of an entirely different magnitude, being roughly 50 to 100 times those of the previously mentioned group.

The wide difference in toxicity between these aliphatic fluoro-chloro compounds and aliphatic chloro compounds brings to attention the need for more fundamental information on these subjects and points out the potential value of such information to the selection and development of safer chemical com-

modities. An obvious suggestion is the development of a non-flammable gaseous anesthetic with a low toxicity.

#### SUMMARY

The results of exposure of dogs and monkeys to dichlorodifluoromethane and dichlorotetrafluoroethane vapor in air shows that the toxicity of these chemicals is very low.

Concentrations of 20 per cent  $\text{CCl}_2\text{F}_2$  by volume produce marked objective symptoms during exposure but they disappear very rapidly after termination of exposure, and no distinct harm is evident after many repeated exposures of eight hours daily. Exposure to 20 per cent vapor in air continuously for 121 hours also produced marked symptoms but did not cause unconsciousness or death.

Concentrations of 14 to 15 per cent  $\text{C}_2\text{Cl}_2\text{F}_4$  by volume produce marked objective symptoms during exposure, but they disappear very rapidly after termination of exposure. No distinct harm is evident after as many as 21 consecutive exposures of eight hours daily. Twenty per cent concentrations or longer exposures daily produce evidence of harm. It is evident that on the basis of equal concentrations in air  $\text{C}_2\text{Cl}_2\text{F}_4$  is distinctly more harmful than  $\text{CCl}_2\text{F}_2$  but is of the same low order of relative toxicity when comparison is made with gases that present public or industrial health hazards.

The odor intensity and irritative

properties of both  $\text{CCl}_2\text{F}_2$  and  $\text{C}_2\text{Cl}_2\text{F}_4$  are high enough to give distinct warning of their presence in concentrations far below those that produce death.

It may be added that the experiments described in this report were performed with a supply of material produced by a semi-commercial plant. It is very possible that small amounts of other halogenated hydrocarbons may have been present. It is known<sup>5</sup> that certain other chloro-fluoro hydrocarbon derivatives have a higher order of toxicity than  $\text{CCl}_2\text{F}_2$  and  $\text{C}_2\text{Cl}_2\text{F}_4$ , and considering the high concentrations of  $\text{CCl}_2\text{F}_2$  and  $\text{C}_2\text{Cl}_2\text{F}_4$  used in the experiments, the presence of fractional percentages of other compounds could have been responsible for a considerable part of the observed response.

#### REFERENCES

1. Midgley, Thomas, Jr., and Henne, A. L. Organic Fluorides as Refrigerants. *Ind. and Eng. Chem.*, 22, 542-45, May, 1930.
2. The chemical properties given in the report are obtained from the following sources:
  - (a) Reference 1.
  - (b) Gilkey, W. K., Gerard, F. W., and Bixler, M. E. Thermodynamic Properties of Dichlorodifluoromethane, A New Refrigerant. *Ind. and Eng. Chem.*, 23, 364-67, Apr., 1931.
  - (c) Private communication with Henne, A. L., Midgley Foundation, Ohio State University, Columbus, O.
  - (d) Observations of the Bureau of Mines.
3. Sayers, R. R., Yant, W. P., Chornyak, John, and Shoaf, H. W. Toxicity of Dichlorodifluoromethane: A New Refrigerant. U. S. Bureau of Mines Report of Investigations 3013, May, 1930, 15 pp.
4. Yant, W. P., Schrenk, H. H., and Patty, F. A. Toxicity of Dichlorotetrafluoroethane. U. S. Bureau of Mines Report of Investigations 3185, Oct., 1932, 10 pp.
5. Work of the Bureau of Mines. To be published. Also work of Kehoe, R. A., Kettering Laboratory of Applied Physiology, University of Cincinnati.



# The Incidence of Xerophthalmia and Night-Blindness in the United States— A Gauge of Vitamin A Deficiency

ALFRED F. HESS, M.D., AND DANIEL B. KIRBY, M.D.  
*New York, N. Y.*

ALTHOUGH we have acquired a considerable fund of knowledge in regard to the vitamins and collected satisfactory data as to their distribution among the various foods, the question is still mooted as to whether there is a sufficiency of these essential food factors in the American dietary. This question is particularly acute in regard to the adequacy of vitamin A in the diet of both children and adults. In view of the importance of this subject and what we believe to be an exceptional opportunity for its elucidation, we decided to carry out a survey of the clinical evidence of early vitamin A deficiency in cities of the various sections of the country.

As is well known, a lack of vitamin A, which has unfortunately been given the titles "the ophthalmic vitamin," "the growth vitamin" or "the anti-infective vitamin," is manifested in young children and infants by a pathologic lesion of the eye which, according to the degree of severity, is designated as xerosis or xerophthalmia. In adults, we are exceptionally fortunate in being able to recognize the deficiency of this vitamin by the occurrence of a disturbance which is functional rather than organic, namely, night-blindedness or nyctalopia. This defect of vision is evidenced by inability to see at night, due to the failure of dark adaptation of the retina; the

affected person may simply note a slight dimness of vision or the lack of vision may be extreme so that he is unable to find his way about even in moderate darkness. In order to ascertain the incidence of these two deficiency manifestations a questionnaire was sent to some 50 leading ophthalmologists in the United States, based on membership in the American Ophthalmological Society, inquiring how often they had encountered moderate or severe cases of xerophthalmia or cases of night-blindness in the course of their private practices. Information was also asked in regard to whether cases of this kind had become more frequent in the course of the current economic depression. Forty-one eye specialists have been kind enough to answer our queries and it is on the basis of such information that we have prepared this short report.

Of the 41 physicians, distributed from the east to the west coast and from Maine to Florida, 11 had not met with cases of xerophthalmia. Most reported having seen but 1 or 2 cases and stated that they regarded the disease as rare. Only 1 is of the opinion that "mild cases are not very rare," adding: "No survey is available at the present time on the incidence of xerophthalmia in this country. As a matter of fact, there are only 12 cases reported in the American literature on this subject. In

RESPONSES OF OPHTHALMOLOGISTS IN REGARD TO INCIDENCE OF XEROPHTHALMIA  
AND OF NIGHT-BLINDNESS

Observer	Xerophthalmia		Night-Blindness	Effect of Depression	Remarks
	Moderate	Severe			
1	Not very rare	4 (babies)	0	Fewer than ever	
2	Very few	Very few	0	No increase	
3	Few	2	2	No increase	
4	No answer	1	0	No increase	
5	No answer	0	0	No increase	
6	No answer	0	0	No increase	
7	No answer	1	0	No increase	
8	No answer	2	0	No increase	
9	No answer	0	0	No increase	Seen 10 years ago
10	No answer	?	0	No increase	
11	2	1	0	No increase	
12	No answer	1	1	No increase	
13	No answer	2	0	No increase	
14	1	No answer	0	No increase	Both dieted
15	0	0	0	No increase	
16	No answer	5	No answer	?	Formerly frequent Five seen in 15 years. Mild cases frequent(?)
17	0	0	No answer	0	Frequent in China
18	Rare	Rare	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	?	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	No answer	No answer	0	0	
26	No answer	2 or 3	0	0	Five cases in 30 years
27	No answer	2	No answer	No answer	
28	No answer	4	No answer	No answer	Two in 5 years
29	No answer	1	No answer	No answer	Four in 5 years
30	No answer	0	No answer	No answer	
31	No answer	0	No answer	No answer	Large number in negroes years ago
32	0	0	1	0	Many cases years ago
33	0	0	0	0	
34	0	0	0	0	
35	0	0	0	0	
36	Rare	Rare	0	0	
37	Yes	No	0	0	Some years ago
38	No	10	0	?	
39	No	Rare	0	0	
40	No answer	3	No answer	No answer	
41	No	2	3	No answer	Three in 2 years Two in 1 year
			0	0	

our community my attention has been called to 5 cases of xerophthalmia in the last 15 years." This was the greatest

number anyone had observed. One wrote, "I have had only 1 case in my practice. This man ate practically

nothing but potatoes." References to a marked restriction of the dietary due to some gastrointestinal disorder or to faddism, were not infrequent. All in all, there is unanimity as to the infrequency of xerophthalmia.

Although cases of xerophthalmia had been reported from time to time, it was not until the period of the World War that this disorder was thrust upon our attention. During the war Denmark exported most of her butter and fed her infants and young children milk which had been skimmed. Before long a disease of the eyes developed among the young. In the 86 cases reported by Bloch,<sup>1</sup> 47 developed this disorder during the first year of life and 20 of these during the first six months. Of Blegvad's<sup>2</sup> 430 cases of keratomalacia, 368 occurred during the first year, the majority in the second quarter; 62 were seen during the second year of life. These figures indicate the marked susceptibility of infants to this disease and, incidentally, their exceptionally high requirement of this vitamin. Among a group of children given whole milk, Bloch found that no instance of eye disease developed. In general, this has been the experience where xerophthalmia has been noted; in fact, no one has reported its development on an average dietary in a normal child. In almost every instance the diet has been exceptionally and preëminently defective. For example, Pillat,<sup>3</sup> who has contributed so greatly to our knowledge of this subject, and has reported its frequency in China among the soldiers, states that they ate "only rice, corn, millet, very little flour; once a month a small quantity of meat and no green vegetables whatsoever. Almost no fat was used for cooking." A similar comment has been made in a recent account of xerosis in Tientsin where the diet of the infants consisted of rice water or condensed milk, and that of the adults of bread, rice or

vegetable water and salted cabbage or turnips.<sup>4</sup> Probably the condensed milk was given greatly diluted. Aykroyd,<sup>5</sup> who has published an interesting account of the development of xerophthalmia among the fishermen in Labrador, states that their diet consisted mainly of white bread, molasses, fresh cod fish, salt meat, beans, peas, some potatoes, but no milk, butter, eggs or green vegetables.

In regard to the effect of the economic depression on the incidence of xerophthalmia, the answers, without exception, were to the effect that this condition had not brought about a noticeable increase. Gifford, of Chicago, who has reported cases of xerophthalmia, wrote: "I have really seen very little of this disorder in spite of the depression and I have been on the watch for it." Bedell, of Albany, who has also contributed to the literature on this subject, answered as follows: "Strangely enough I am seeing fewer of these cases at this time than ever, so that the depression has not had any effect in increasing their incidence." This evidence from those who would be expected to see cases of this description is substantiated by the fact that in the Quarterly Index of medical literature for the latter half of 1932, no instance of xerophthalmia is reported from the United States. Although references to night-blindness have been recorded in previous volumes of the Quarterly Index, this disorder is entirely omitted from the latest volume.

The other clinical evidence of a deficiency of vitamin A, night-blindness, can be elicited only in older children or in adults. This sign gains added significance from the fact that it is functional, unaccompanied by ophthalmoscopic evidence; and that it is quickly, almost miraculously, remedied when the dietary is fortified with vitamin A. For example, 1 or 2 teaspoonfuls of cod liver oil will often cure

the condition from a functional standpoint within 24-48 hours. In this symptom we possess the most delicate of all indicators for vitamin deficiency; in relation to no similar disorder have we as yet a sign or test which is unaccompanied by pathologic change. Among the 41 answers only 8 cases of night-blindness were reported by the various specialists, 1 writing that he had met with 3 instances in the past 2 years. That night-blindness is due to a lack of vitamin A was proved in 1925 by the interesting experiments of Fridericia and Holm,<sup>6</sup> who showed that the visual purple of the retina, after exposure to strong sunlight, was particularly slow to regenerate in rats which had been on a diet devoid of vitamin A. The biologic experiments of Yudkin and his coworkers<sup>7</sup> indicate that the retina is exceedingly rich in vitamin A. Indeed Yudkin found, according to a later report,<sup>8</sup> that the retina of the hog is richer in vitamin A than is butter-fat, although the choroidal tissue is almost devoid of it. It may be stated without fear of controversy, that night-blindness is a rare disorder in the United States and that most of the reports of this disturbance emanate from countries where there has been famine or a marked deficiency of food. Without entering into detail, it may be stated that a review of those cases which have been reported from the United States and Europe shows that, as in the case of xerophthalmia, they have been occasioned by either a notable defect in diet due to idiosyncrasy or by some condition which induced a lack of utilization of the food. Drunkards are especially susceptible. A report of the Copenhagen Poor Law Institution states that 45 per cent of the 312 inmates were found to suffer from

night-blindness and that this disorder followed the consumption of corn brandy.<sup>9</sup>

#### CONCLUSION

A formal inquiry carried out among the leading eye specialists throughout the United States may be summarized by the statement that xerophthalmia is of rare occurrence in this country and that night-blindness is even more exceptional. Furthermore, it is the consensus of opinion that there is no indication whatsoever that either of these diseases has increased in frequency during the economic depression. As both of these disorders are the result of a deficiency of vitamin A, it would seem as if a lack of this vitamin among the child and adult populations is extremely uncommon. This conclusion is all the more warranted in view of the fact that night-blindness is a very early and purely subjective symptom of vitamin A deficiency, occurring before any ophthalmoscopic evidence or microscopic lesion can be noted in the retina.

#### BIBLIOGRAPHY

1. Bloch, C. E. Carbohydrate Starvation in Infants. *Ugesk. f. læger*, 79, 309, 1917.
2. Blegvad, O. Xerophthalmia, Keratomalacia and Xerosis Conjunctivae. *Am. J. Opth.*, 7, 1, 1924.
3. Pillat, Arnold. The Frequency of Deficiency Diseases of the Eye Due to Lack of Vitamin A in a Military Camp North of Peiping. *Natl. Med. J. of China*, XV, 589, 1929.
4. Editorial. Le Xerosis à Tientsin. *La Presse Med.*, 40, 745, 1932.
5. Aykroyd, W. R. Beriberi and other Food-deficiency Diseases in Newfoundland and Labrador. *J. Hyg.*, 30, 357, 1930.
6. Fridericia, L. S., and Holm, E. Experimental Contribution to the Study of the Relation Between Night Blindness and Malnutrition. *Am. J. Physiol.*, 73, 63, 1925.
7. Yudkin, A. M., Kriss, M., and Smith, A. H. *in* A Potency of Retinal Tissue. *Am. J. Physiol.*, 97, 611 (July), 1931.
8. Yudkin, A. M. The Presence of Vitamin A in the Retina. *Arch. Opth.*, 6, 754 (Oct.), 1931.
9. Lungsgaard, K. K. K. On Night-Blindness and Other Eye Complications in Chronic Alcoholists. *Acta Opth.*, 2, 112, 1924.

# A Modified Quevenne Lactometer for the Public Health Laboratory Control of Market Milk\*

R. V. STONE, F.A.P.H.A.

*Director of Laboratories, Los Angeles County Health Department  
Hall of Justice, Los Angeles, Calif.*

THE Dairy and Milk Laws of the State of California require that at least two street samples of market milk be collected every month from delivery wagons, these samples to be routinely subjected to the standard plate count, to a test for butter fat, for the amount of sediment and for the solids not fat.

Although the Standard Methods of the A.P.H.A. and A.O.A.C. give the official methods for practical reasons the Babcock test and the lactometer are used throughout the State for the fat determinations and for computing the solids not fat. Actual extraction and gravimetric determinations cannot be conducted in the average laboratory because of the time involved in such determinations. Where milk work alone is handled by a laboratory, the Majonnier and chemical analysis is possible; but milk work in California public health laboratories constitutes only one of many widely variegated procedures, all of which is conducted frequently by but one or two State authorized bacteriologists. Most of such laboratories do not employ a specialist in chemistry.

Accordingly, the lactometer has carried a great deal of responsibility in such work and because accuracy in

these instruments varies with the extent of range that the stem includes, it was true that the same distributor's milk tested on the same day in two or more neighboring health department laboratories did not give comparable findings as regarded solids not fat. This led to dissatisfaction on the part of dairymen and others, and the laboratory was blamed for inaccuracy of technic when, as a matter of fact, physical equipment that was not standardized for accuracy was to blame.

A state law considers an 8.7 per cent solids not fat as a full score milk; whereas a milk below 8.5 per cent solids not fat is illegal. The Los Angeles County Health Department Laboratories was authorized by the County Health Officer (Dr. J. L. Pomeroy) to investigate existing conditions that appeared to be working certain injustices to the dairy industry.

It was soon established that a variety of instruments were in use throughout the state, the length ranging from 6 to 9, to 10 or 12 inches. The length of graduation between 14 to 42 Quevenne degrees varied from 1½ to 4¼ inches. Some instruments contained thermometers as a part of the whole; some were for "pure" milk and skim milk in one instrument. A considerable number of instruments of cheap foreign manufacture were in use.

\* Discussed before the California Association of Dairy and Milk Inspectors, at San Bernardino, Calif., on October 9, 1928, and at Oakland, Calif., on October 9, 1929.

These did not have a manufacturer's name on them and seldom checked one against another.

Some instruments were recommended to be read at the *top* of the meniscus while others were to be read at the *surface* of the liquid. Such recommendations were on the slip of paper packed in the instrument—not on the instrument itself. Such a record was soon divorced from the instrument itself so that an operator not knowing the manufacturer's design would proceed as in the usual spindle reading and record the specific gravity as that where the surface of the liquid cut across the stem. This permitted of errors of one full degree or more dependent upon the spacing of the degree graduations on the stem. Since one degree is equivalent to .25 per cent of solids not fat, such an error could throw a fully legal 8.7 per cent milk into an illegal 8.45 per cent solids not fat. Conversely an illegal milk could be thrown into a fully legal milk if the reading was made at the surface of the liquid on a "top of meniscus" standardized lactometer.

The retail price of these various types of lactometers ranged from \$1.25 to \$5.00. When one considers the relatively high price precision instruments demand, it should be recognized that the cheaper instruments could not possibly be depended upon.

American manufacturers generally devote care in the products they are to sell, and such were certainly much more comparable in the reading of more than one instrument on the same milk than were the cheap "flood" of imported stock. However, it is doubtful that any of them expected that an instrument selling for a relatively low price (compared with laboratory equipment generally) would be absolutely accurate for whole milk, skim milk, and for temperature.

In answer to a written inquiry from us, Ernest Kelly replied:

I have your letter of the thirteenth regarding the method of reading lactometers. There is a considerable diversity in this practice in various places. I took the matter up with the Bureau of Standards some time ago and found that they read to the top of the meniscus when standardizing lactometers that are sent in to them. This being the case, it is apparent that lactometers which have been standardized by the Bureau of Standards should be read to the top of the meniscus. I do not understand just why lactometers should be standardized in this way. It seems that there should be a good deal of work done to check up this method with specific gravities determined by other methods.

With the ordinary lactometer the difference between the top of the meniscus and the surface of the liquid is approximately one degree. This would make a difference of about .25 per cent in solids not fat as calculated, so that if there is not a standard method of reading the lactometer there would be an unfortunate variation in calculating the solids.

It is obviously impossible to read the lactometer at the exact surface level of the liquid. I have usually read the lactometer at the point where the scale is plainly visible through the meniscus. However, if all lactometers are standardized to the top of the meniscus, that is the place where readings should be made.

A letter from the referee for the Association of Official Agricultural Chemists written by Dr. Robert S. Breed under date of April 26, 1927, said:

I find on looking up the methods of the A.O.A.C. that they recommend that specific gravities of milk be determined by the use of the pycnometer. The lactometer method is a rough and ready method satisfactory for certain purposes but is not sufficiently accurate to have received the approval of this Association. The Westphal balance method is likewise accurate and perhaps more convenient than the pycnometer.

#### EXPERIMENTAL WORK

Milk was used rather than standardized solution, in making our comparisons. Pycnometer determinations were used to adopt a standard. Against such readings various lactometers were used for tests upon the same market milk. Eighteen foreign imported lactomet-

FIGURE I

This as a whole shows actual comparison in length by inches of the three lactometers worked with extensively.

A is the U. S. Department of Agriculture lactodensimeter.

B is the usual lactometer seen in use by dairy laboratories. It combines temperature, pure milk, and skim milk readings.

C is the "Stone type" lactometer with the short range of specific gravity scale.

D is the Thermometer arrangement showing pencil clip that holds thermometer to jar.

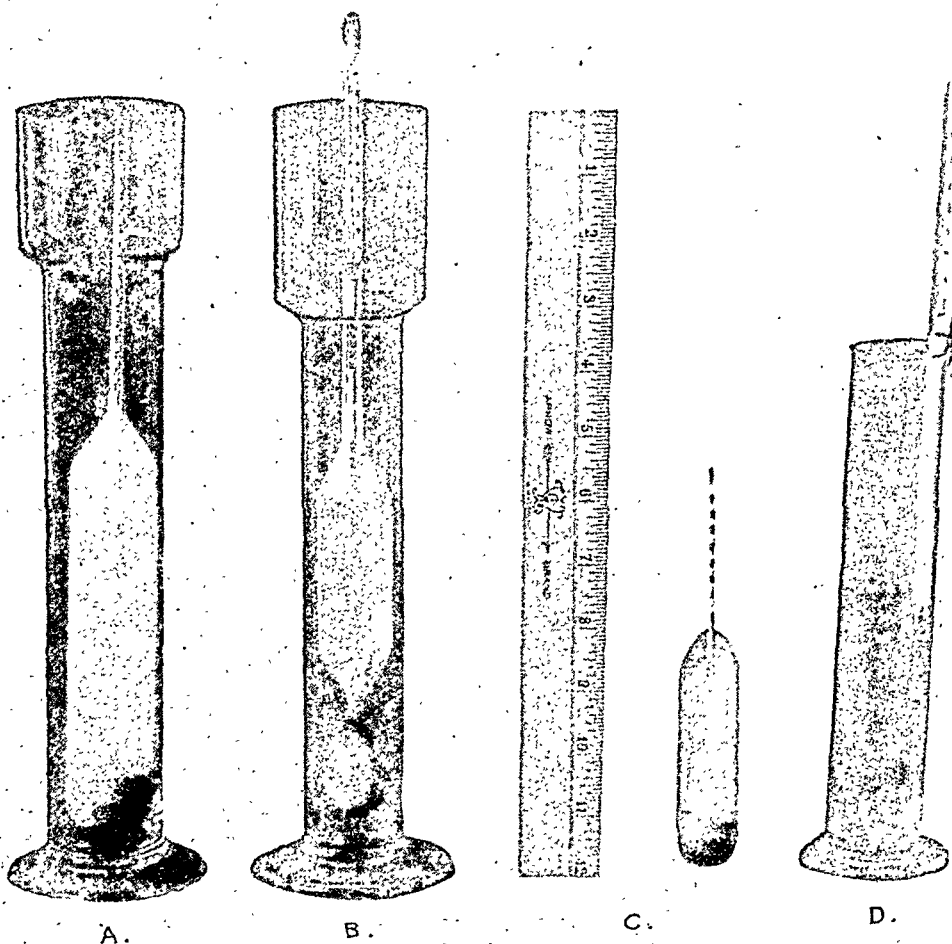


FIG. I

yielded only three that were accurate enough to use with a certain feeling of confidence; the other fifteen varied from 0.3 to 1.5 degrees at 60° F.

An instrument was purchased of a type from which we selected by gravimetric determinations an accurate "standard" lactometer to use routinely as the control against which we checked many lactometers obtained in the local

market and from other laboratories. This was the United States Department of Agriculture lactodensimeter. It has a range from 24 to 37 Quevenne degrees distributed over a scale of  $3\frac{1}{4}$  inch length. Each degree is divided into  $1/10$ 's. Thus, each degree is approximately  $\frac{1}{4}$  inch in height and the variation by the reading at the surface of the liquid, or at the top of the

meniscus, by such length scale minimized the inaccuracies of a shorter scale instrument. However, in the control of market milk the actual specific gravity scale in which we are interested includes those just above and just below the perfect scoring and the illegal product. Our main objection to this lactodensimeter is that its size necessitates a large hydrometer jar and a considerable amount of milk to facilitate reading. Furthermore, the bulk of the instrument introduces a factor of delay while waiting for the temperature of the instrument and the temperature of the liquid to become the same.

Late in 1928 an attempt was made by us to interest manufacturers of laboratory precision instruments in a special lactometer designed particularly for routine health department control work. In May, 1929, Hiergesell Bros., of Philadelphia, Pa., submitted a blueprint which incorporated the requirements we had made as being desirable.

The range in Quevenne degrees was reduced to 29–35 degrees. Thus 22 Quevenne degrees were eliminated from the older type of scale. The thermometer was discarded as a part of the instrument, since it was our firm belief that accuracy in but one thing was more possible of attainment than if other factors were introduced into the in-

strument's construction. This, commercially, has become known throughout the State of California as the "Dr. Stone type" and has been introduced through its own merits as the recommended State lactometer. Coincident with its use, the variations on the same milk in different laboratories practically ceased.

The thermometer used is a "cloud and pour"  $4\frac{1}{4}$  inch immersion, with a range of  $36^{\circ}$  to  $120^{\circ}$  F. in two-degree divisions. The total length is  $8\frac{3}{4}$  inches and is designed according to the ASTM specifications. It is fastened to the ungraduated cylinder (used instead of a hydrometer jar) by means of an ordinary pencil clip. This fixing of the thermometer to the jar permits of ready pouring of milk samples in and out without disturbing the thermometer. Thermometer, clip and jar are shown in Figure I at the righthand side of the picture. The cylinder used is a lipped, ungraduated cylinder and is  $1\frac{5}{8}$  inches outside diameter and is  $8\frac{1}{4}$  inches high. A half-pint milk sample can be tested using this style thermometer and the Stone Lactometer. At present but one manufacturer has coöperated in the making of this instrument but there is nothing to prevent other manufacturers from making it as there are no royalties or patents involved with this design.

---

## Marriage Premiums in Italy

THE National Bureau of Maternal and Child Welfare of Italy has recently begun to give premiums to mothers of illegitimate children who later marry, at the time of their marriage. At the beginning of the present year this policy was extended to all young women intending to marry, and 2,000,000 lire was appropriated for that purpose.

Each premium is to amount to about 200 lire. A list is to be kept of the women receiving these premiums, and during pregnancy and after the birth of a child they will be asked to take advantage of the health centers, day nurseries, free lunch rooms, and other welfare arrangements maintained by the Bureau.—*Maternita ed Infanzia*, Rome, Mar., 1933.



## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMANN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## THE DEPRESSION AND HEALTH

THE effects of the depression on public health have been discussed from various aspects. In our August number we carried a paper in which evidence which had been subjected to careful scrutiny was brought forward by one clinic to show that malnutrition is showing some effects. Those who have lived in the drought section, which was affected by floods only a few years ago, have had some first-hand experience and have been somewhat doubtful as to the evidences of malnutrition due to the depression since many of the cases in which malnutrition undoubtedly existed were proved to have preceded the drought. Indeed, many health officers have remarked on the unusual good health throughout the country and the marked absence of bad effects attributable to the depression. All, however, have been uneasy over the situation and feel confident in predicting that bad effects of greater or less severity will be seen sooner or later. However, we must be grateful that the results are no worse than are so far evident.

In many states of the Union, boards of health have had their budgets cut, in some cases to an alarming extent. Personnel has been reduced and certain activities discontinued. One of the most serious things which have happened to public health is the curtailment of funds for the U. S. Public Health Service. When the drought hit hardest, the government was in a position to appropriate money to be apportioned by the Service in aiding the affected states for one year. Then a bill was brought in which passed through the Senate without a dissenting vote, increasing by three times the amount for assistance, and extending the aid to every state in the Union which needed it. Some thought that this provision would insure its passage. Nevertheless, the bill was killed, and assistance for the drought areas by our government ceased.

Recently we have had a report from the Surgeon General of the Public Health Service which tells of the cuts which will be in effect for the fiscal year beginning July 1, 1933. The total amount allowed by the Bureau of the Budget is \$7,860,000, although \$10,380,328 was appropriated by Congress. This means, of course, extensive curtailment of activities, although every effort is being made to keep those which are essential in motion. The salaries of all officers have been cut 15 per cent. Further savings have been effected by retiring a number of commissioned medical officers, some of whom are well known to the profession of the United States and Europe, and whose services can ill be spared. The marine hospitals and field relief stations have been cut to \$4,420,000 from \$5,600,000. In some quarters there has been a feeling that sick people will be taken care of, regardless of government help. Aid for county health units in 28 states which have been assisted by the Public Health Service will be cut off, and there is little doubt that many of these will be abandoned, though it is hoped that the states and counties will continue as many of them as possible.

The quarantine and immigration services in foreign ports have been greatly reduced, some 10 American physicians having been discharged; others, together with 700 acting assistant surgeons on part-time service, have suffered reductions in salaries.

What many will feel as a peculiar injury is the reduction by some 50 per cent of funds for scientific research. This will come at a time when the new buildings of the National Institute of Health, in which we might well hope for an increase of research, are nearing completion. The list of employees dropped is large; 13 from the Washington office, 650 from field stations, and 310 from rural sanitation. Some 1,500 others will be required to take 5 days vacation each month without pay.

All the readers of this *Journal* recognize what President Cleveland once said—that we are confronted by a condition and not a theory—yet we believe that cutting appropriations for health work is the poorest sort of economy. Health is wealth, and no nation has ever been great and maintained its greatness on a feeble population. Doubtless some economies can be made without injury to the protection afforded by the Public Health Service and the National Institute of Health, but we must still hope for expansion, rather than contraction, and entirely apart from how it may affect individuals, all anxiously look forward to the day when liberal funds will again be supplied and full activities be resumed. All of our members and readers should urge this point of view, and do all they can to keep appropriations for public health purposes at the highest possible level.

## MALARIAL FEVER

ONE of the distinctive services rendered to the world by the Health Organization of the League of Nations has been its outstanding studies on malaria. Presumably even to those who live in malarial countries and know something of its ravages, the reports made by the League of Nations since its Commission was established in 1923 have been astonishing. Three major reports have been issued, the last one before the present showing the requirements for quinine in malarial countries and the prevalence of the disease. The use of quinine increased threefold from about 1880 to 1911, and the price has also increased threefold since

1892. The annual purchase of quinine was estimated at some 12 million dollars, though it is common knowledge in every country that a large portion of those infected with malaria do not receive specific treatment.

The last report treats of the therapeutics of malaria. Since there is no disease in which the sterilization of cases is more important as a matter of prevention than malaria, this report is of great interest from the prophylactic standpoint. There are several apparent contradictions in the behavior of malaria which render treatment and sterilization difficult. When the mosquito cycle of the malarial parasite was demonstrated, some believed that the disease could be overcome by making a break in the epidemiological chain by the use of quinine to destroy the parasite in the human host. Others believed that the destruction of the carrier mosquito, as well as of breeding places, offered the best success. It can now be said, on the evidence of extensive field experiments, that quinine has always failed as a mass preventive, and though we know it cures developed attacks, it does not always prevent either man or the mosquito from becoming infected.

One of the great problems of the Commission was to answer questions as to the prevention of infection, the prevention of relapses, and the determination of a mass treatment which would destroy gametocytes and thus prevent infection of mosquitoes. They state categorically that no drug is known, which, taken in doses which are not injurious during the infection, will effectively destroy the sporozoites of malaria before they are able to continue their life cycle in the human host. There is no drug nor any combination of drugs which will positively kill all parasites in the human host, and certainly prevent relapse.

The Commission further disapproves of attempts to bring about sterilization of all parasites during first attacks, and recognizes that nature provides a defensive mechanism which in the course of time produces immunity. Where sterilization is complete, this immunity is not developed. The frequency as well as the severity of relapses depends largely on the defensive powers of the infected person, and though this may be natural in some cases, it is also acquired. Consequently, the infected person should be allowed to develop this acquired immunity as well as the defensive power, if possible. If treated by large and continuous doses of specific drugs, they do not have an opportunity of developing defense, and experience has shown that, as a rule, such persons relapse every month over a long period. For this reason no attempt is made to prescribe a treatment for the prevention of relapses during the primary attack, and use of the specific drug at a later period and more sparingly during later recrudescences is advised. This applies particularly to benign tertian and quartan types of fever. For malignant tertian (*Aestivo autumnal*) it is considered justifiable to sterilize by specific drugs during the first recrudescence. In conditions in which it is not considered justifiable positively to prevent relapses, a system of clinical prophylaxis, which consists of giving 6 grains of quinine daily throughout a period of residence in a malarial country, and for some months after, is advocated. This does not completely eradicate the infection, so the defensive mechanism of the body is allowed to work and become increasingly powerful; it reduces the number of gametocyte carriers and their capacity for infecting mosquitoes, and at the same time enables agricultural and other workers to pursue their tasks.

Gametocytes are produced in greater numbers in primary attacks and early recrudescences than later, so that in highly endemic areas, little could be accomplished in preventing transmission of malaria without treatment of infants and children. It seems that in such areas adults seldom carry a sufficient number

of gametocytes to insure the infection of mosquitoes, and this is probably one of the reasons why mass treatment usually gives poor results.

The Commission repeatedly asserts that treatment with quinine can never be regarded as a *therapia sterilisans magna*. Knowledge of malaria now seems to be advancing after standing practically still for a number of years. This is attributed to the study of the biological aspects of the subject, while the discovery of effective synthetic antimalarial remedies has led to many experiments and to a promise of improvements in the treatment of the disease. A clear, and we believe useful, practical distinction is drawn between sporozoite therapy, which is called true causal prophylaxis, and clinical prophylaxis. For the first, it is the opinion that no drug is known which in harmless doses can be considered certainly effective. For the second, quinine is the most effective and best drug known, and daily doses of 6 grains are advised.

As far as the prevention of spread goes—and in this we are particularly interested—quinine and atabrin are effective in benign tertian and quartan, but against the gametocytes of malignant tertian (*Aestivo autumnal*) these drugs have only a feeble action. Plasmoquine has a powerful action against them, and it is recommended that it be given twice a week during the time when crescents are present in the peripheral blood. In badly infected areas (in Lagos, 90 per cent of the young children and 50 per cent of adults harbor malignant tertian parasites in their blood, and neighboring rural districts in all probability practically the entire population over 1 year of age, some 120,000 persons, carry malarial parasites in their blood continuously) it may become possible to substitute for present schemes of mass treatment a rational plan which will stop malaria from being fatal and mitigate its severity without interfering with the process leading to acquired immunity, which the Commission believes is most important to adult populations. In 1927, the Commission advised countries in which malaria was extremely prevalent to content themselves with the organization of their public health service on these principles, rather than to undertake such radical measures as are necessary for the complete elimination of the parasites.

#### REFERENCE

1. The Therapeutics of Malaria. Third General Report of the Malaria Commission. *Quarterly Bulletin of the Health Organization of the League of Nations*. II:2 (June), 1933.

## NONSPECIFIC IMMUNITY BY HETEROLOGOUS VACCINATION

IMMUNITY is one of the most interesting as well as most important reactions of which we have any knowledge. Almost from time immemorial, it has been known that one attack of most contagious diseases protected from a second, generally throughout life. The first to theorize rationally on the subject and propose explanations of immunity was Pasteur, who discovered the first bacterial vaccine, when he found that attenuated cultures of the chicken cholera organism would protect against virulent ones. From that time on, experiments have been brought forward with confusing rapidity, and while we can say certainly that we know a good deal about immunity in general, and certain types of immunity in particular, there are still many points which remain to be clarified.

A recent piece of work is of more than usual importance. Armstrong and Harrison<sup>1</sup> have carried out experiments on a large number of animals immunized

against tetanus and botulinus, vaccine virus, and antityphoid vaccine, using normal saline injections as controls. After a proper period, these animals were injected with known fatal doses of diphtheria toxin-antitoxin, poliomyelitis virus, and cultures of *B. prodigiosus*. The general conclusion is that the various substances against which the animals were immunized exercised a subsequent protective action against the infectious and toxic agents used. The authors believe that this increased resistance is due to a "mobilization, strengthening and training of the defense mechanism." They recognize that increased resistance produced through heterologous immunization is only relative, and is not very strong, though they believe that the evidence indicates that it may be of value in modifying the course of such subsequent infections as poliomyelitis and post-vaccinal encephalitis, as well as in increasing resistance to various subsequent infections.

In a review of the literature, it is pointed out that as early as 1893, Klein found that intraperitoneal injections of several varieties of bacteria would render guinea pigs refractory to known fatal doses of the same or other germs given from 8 to 12 hours later by the same route. These experiments have been confirmed by a number of observers, and some have even shown that preliminary intraperitoneal injections of various substances—bouillon, peptone, urine, etc.—would give a certain degree of immunity. In a few instances, the immunity against certain bacteria such as *B. cholerae*, was quite marked. The experiments cited include injections with yeast and with virulent tubercle bacilli, the latter of which were said to have rendered guinea pigs refractory to a certain extent against virulent anthrax. Vaccination against tuberculosis on a large scale, as carried out by Calmette with BCG, indicates that this nonspecific immunity notably reduces the general mortality of infants.

The increased protection by heterologous vaccines has been attributed to a cross-immunity, which is assumed and does not appear ever to have been proved. Armstrong and Harrison discredit this explanation on account of the great variety of substances which have been found capable of inducing increased resistance, and also the failure to find antibodies in the serum which show any cross-protection. They discuss also the fact noted in various camps during the World War, that recruits from rural areas were much more subject to infectious diseases than those who came from cities. An unusually striking instance of this was observed among two groups of Missouri recruits. The explanation in the majority of these cases seems clearly to be that urban dwellers are much more exposed to the ordinary so-called infectious diseases of childhood, but the point has been made by Love and Davenport that this would hardly account for the lowering in the incidence of such diseases as lobar pneumonia and cerebrospinal meningitis.

Long ago, Metchnikoff attributed such increased resistance to the breaking up of the phagocytes (phagolysis) and the setting free of cytase, at least as far as those cases in which some immunity is induced by intraperitoneal injections of bouillon. The general fact remains that as we grow older, we are apt to become less susceptible to certain infectious diseases, and this has been variously attributed to mild and unrecognized attacks or to vaccination by small, non-clinical, disease-producing infections. The whole matter is of extreme interest and importance, to which the contribution referred to has added valuable material.

#### REFERENCE

1. Armstrong, Charles, and Harrison, W. T. Heterologous Experience (Immunization) as a Factor in Resistance to Disease, *Pub. Health Rep.*, June 2, 1933, pp. 597-609.

## Letter to the Editor

To the Editor:

I desire to caution rural health officers in placing blind confidence or reliance in the immunization results obtained and reported by Dr. William H. Park in his article in the June issue of the *Journal*, following the use of toxoid.

Dr. Park states that two doses of Ramon toxoid of from 5 to 10 flocculation units per c.c. will immunize 90 to 98 per cent of young children who receive it and a slightly smaller per centage of older children.

These excellent results may be expected in a city of the size of New York with its great aggregation of people, but not in rural sections. We must realize thoroughly the effect aggregation and other factors have on the whole diphtheria situation in coming to any conclusions on results obtained.

Doull has shown that 72 per cent of New York City children in the 10-14 age group were previously Schick negative. In Worcester County, Maryland, a rural county, we have found as the result of 1,050 previous Schick tests, that only 21 per cent of this specific age group were Schick negative. As negative previous Schick tests depend upon children possessing enough autogenous antitoxin, obtained by natural processes, to neutralize the toxin in the Schick, it is safe to assume that each individual child in the positive group in New York had a larger quantity of this antitoxin than the 79 per cent who were positive in Worcester County. It therefore follows that it is necessary for toxoid to stimulate a greater amount of antitoxin in each child in Worcester County, Maryland, or in any other rural com-

munity, to render it Schick negative.

A series of 1,208 Schick tests have just been completed in the above named rural community, one year after each child in the series had received two doses of the Ramon toxoid of 5 to 10 flocculation units per c.c. Only 69 per cent of the white children in this group were rendered Schick negative.

The writer predicts that as the evidence is collected, as to the lack of response of rural children to the Ramon toxoid, either the antigenic content of this type toxoid will have to be increased or the Ramon toxoid will be completely replaced by the Havens' type alum-precipitated toxoid.

A series of 100 colored children were given a 1 c.c. dose of the Havens' toxoid, all of whom were previously Schick positive. Six to seven weeks later, Schick tests were done on 93 of these children and 92 or 98.8 per cent were found Schick negative.

It should be noted that control tests were done on all the children mentioned to eliminate the pseudo-positive reaction.

If rural health officers all over the country rely implicitly on Dr. Park's results and eliminate the subsequent Schick test to check the results obtained in each locality, unfortunate occurrences will develop in the future which will shake the public's confidence in diphtheria immunization.

I shall be glad to submit in detail the results of the diphtheria immunization work carried on in a strictly rural county at the next annual meeting.

BRADFORD MASSEY, M.D.,  
Deputy State Health Officer.

Pocomoke City, Md.,  
June 27, 1933.

PRELIMINARY PROGRAM OF THE SIXTY-SECOND  
ANNUAL MEETING  
AMERICAN PUBLIC HEALTH ASSOCIATION

INDIANAPOLIS, IND., OCTOBER 9-12, 1933

THE Annual Meeting Program Committee presents the preliminary program of the scientific sessions of the Sixty-second Annual Meeting of the American Public Health Association and information concerning meetings of related organizations.

The program of the Institute on Health Education to be held October 7, 8 and 9 will be found on pages 968 and 969.

Since the following program cannot be considered definite in every respect now, delegates are urged to consult the Final Program, available at the Registration Desk in the Claypool Hotel at the time of the meeting. All meetings, unless otherwise stated, will be held in the Claypool Hotel.

*Monday, 9:30 A.M.*

HEALTH OFFICERS

*First Session—Travertine Room, Lincoln Hotel*

An Unusual Outbreak of Para-Typhoid A. JOSEPH P. FRANKLIN, M.D., Health Officer, Allegany County, Cumberland, Md.

*Discussion.* G. FOARD MCGINNES, M.D., Director of Laboratories, State Department of Health, Richmond, Va.

Heart Disease. LOUIS I. DUBLIN, PH.D., Third Vice-President and Statistician, and DONALD B. ARMSTRONG, M.D., Third Vice-President, Metropolitan Life Insurance Company, New York, N. Y.

Responsibility for the Health Program. MORRIS FISHBEIN, M.D., Editor, *Journal of the American Medical Association*, Chicago, Ill.

*Discussion.* CHARLES F. WILINSKY, M.D., Deputy Commissioner, Child Hygiene Division, Department of Health, Boston, Mass., and MATTHIAS NICOLL, JR., M.D., Commissioner of Health, Westchester County, White Plains, N. Y.

*Section Business.*

VITAL STATISTICS

*First Session—Empire Room*

*Section Business.* Appointment of Nominating Committee.

The Work and Plans of the Section Council. J. V. DEPORTE, PH.D., *Chairman* of the Section, Director, Division of Vital Statistics, State Department of Health, Albany, N. Y.

Monday, 9:30 A.M.

## VITAL STATISTICS (Cont.)

### *First Session—Empire Room*

Prospects for Completing the Registration Area (Report of the Committee). *Chairman*, T. F. MURPHY, M.D., Chief Statistician for Vital Statistics, Bureau of the Census, Washington, D. C.

Collection of Accident Statistics (Report of the Committee). *Chairman*, W. THURBER FALES, Sc.D., State Registrar, State Board of Health, Montgomery, Ala.  
*Discussion*. R. L. FORNEY, National Safety Council, Chicago, Ill.

Should Birth and Death Certificates Be More Specific as to Residence for Purposes of Allocation? (Report of the Committee). *Chairman*, A. W. HEDRICH, Sc.D., Associate in Biostatistics, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

Report of the Committee on Registration of Births of Illegitimate and Adopted Children. *Chairman*, SHELDON L. HOWARD, State Registrar, State Department of Public Health, Springfield, Ill.

*Discussion*. W. J. V. DEACON, M.D., State Department of Health, Lansing, Mich.

Procedure as to Filing Deferred Certificates (Report of the Committee). *Chairman*, STEWART G. THOMPSON, D.P.H., Director, Division of Vital Statistics, State Board of Health, Jacksonville, Fla.

Classification of Stillbirths (Progress Report of the Committee on Accuracy of Certified Causes of Death). *Chairman*, HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

## EPIDEMIOLOGY

### *First Session—Assembly Room*

Outbreak of an Erysipeloid Condition Among the Workers in a Bone Button Factory Due to the Bacillus of Swine Erysipelas. G. FOARD MCGINNES, M.D., Director of Laboratories, and FORREST SPINDLE, State Department of Health, Richmond, Va.

Diphtheria Studies: I. The Significance of the Schick Test in the Adult. C. C. YOUNG, D.P.H., Director; W. E. BUNNEY, Ph.D., Associate Director; GEORGE D. CUMMINGS, Bacteriologist; MINNA CROOKS; and FILIP C. FORSBECK, M.D., Epidemiologist; State Department of Health Laboratories, Lansing, Mich.

Measles Epidemic in Albany, New York, in 1926-1927. EDWARD S. GODFREY, JR., M.D., Director, Local Health Administration, State Department of Health, Albany, N. Y. (*Stereopticon Illustration*.)

The Epidemiology of Lobar Pneumonia. WILSON G. SMILLIE, M.D., Professor of Public Health Administration, Harvard University School of Public Health, Boston, Mass., and FREDERICK S. LEEDER, M.D., Medical Director, Southern Berkshire Health District, Brookline, Mass. (*Stereopticon Illustration*.)

Rocky Mountain Spotted Fever: Observations on Epidemiology with Particular Reference to the Western United States. R. R. PARKER, Ph.D., In Charge, Rocky Mountain Spotted Fever Investigations, U. S. Public Health Service, Hamilton, Mont. (*Stereopticon Illustration*.)

*Section Business.*



*Monday, 9:30 A.M.*

## INDUSTRIAL HYGIENE

### *First Session—Club Room*

**Industrial Intoxication Following Skin Sorption.** CAREY P. MCCORD, M.D., *Chairman* of the Section, and Medical Director, Industrial Health Conservancy Laboratories, Cincinnati, O.

**X-Ray Findings in So-Called Acute Silicosis.** HOMER L. SAMPSON, Director, Trudeau Sanatorium, Trudeau, N. Y.

**The Pathological Lesions in So-Called Acute Silicosis.** LEROY U. GARDNER, M.D., Director, Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, N. Y.

**The Silica Content of the Lungs of a Group of Tunnel Workers.** CLAYTON S. SMITH, PH.D., and HELEN L. WIKOFF, PH.D., Laboratory of Physiological Chemistry and Pharmacology, Ohio State University, Columbus, O.

*Section Business.*

## CHILD HYGIENE AND PUBLIC HEALTH NURSING SECTIONS AND THE AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

### *Joint Session—Riley Room*

#### SCHOOL HEALTH PROGRAMS

**Scarlet Fever Immunization.** O. B. NESBIT, M.D., Board of Education, Gary, Ind.  
*Discussion.* GEORGE H. RAMSEY, M.D., Director, Division of Communicable Diseases, State Department of Health, Albany, N. Y.

**Educator's Viewpoint.** DELBERT OBERTEUFFER, PH.D., Ohio State University, Columbus, O.

*Discussion.*

**Medical Viewpoint.** GEORGE B. DARLING, DR.P.H., W. K. Kellogg Foundation, Battle Creek, Mich.

*Discussion.*

**Nurse's Viewpoint.** NELLIE PALMER, R.N., Bureau of Nursing, Board of Education, Des Moines, Ia.

*Discussion.*

**Conducted Tour of the Exhibits.**

*Monday, 12:30 P.M.*

## PUBLIC HEALTH NURSING

### *Luncheon Session—Chateau Room*

*Section Business.*

Monday, 2:30 P.M.

## HEALTH OFFICERS

*Second Session—Riley Room*

### MODERN TRENDS IN PUBLIC HEALTH ADMINISTRATION

State Health Work. E. L. BISHOP, M.D., State Commissioner of Public Health, Nashville, Tenn.

City Health Work. JOHN P. KOEHLER, M.D., Commissioner of Health, Milwaukee, Wis.

County Health Work. JOSEPH W. MOUNTIN, M.D., Surgeon, U. S. Public Health Service, Washington, D. C.

## LABORATORY

*First Session—Assembly Room*

*Presiding:* ANNA W. WILLIAMS, M.D., *Chairman*, Laboratory Section.

*Address.* ANNA W. WILLIAMS, M.D., Bureau of Laboratories, Department of Health, New York, N. Y.

Report of the Committee on Standard Methods. *Chairman*, AUGUSTUS B. WADSWORTH, M.D., Division of Laboratories and Research, State Department of Health, Albany, N. Y.

Laboratory Problems in Milk Pasteurization (Preliminary Report of the Committee on Milk Pasteurization Studies). *Chairman*, ROBERT S. BREED, Ph.D., New York State Agricultural Experiment Station, Geneva, N. Y.

Report of the Committee on Water Pollution Studies. *Chairman*, JAMES A. NEWLANDS, Henry Souther Engineering Company, Hartford, Conn.

Report of the Committee on Bathing Places. *Chairman*, W. D. STOVALL, M.D., State Laboratory of Hygiene, Madison, Wis.

### SYMPOSIUM ON THE CONTROL OF FOOD HANDLERS AND THE DETECTION OF CARRIERS AMONG THEM

Detection by Laboratory Methods of Disease Carriers Among Food and Drink Handlers. RALPH EMERSON DUNCAN, M.D., Department of Health, Kansas City, Mo.

Control of Food Poisoning with Reference to the Medical and Laboratory Examination of Food Handlers. JACQUES P. GRAY, M.D., Department of Public Health, San Francisco, Calif.

The Feasibility of Attempting to Control Enteric Disease by the Examination of Specimens from Food Handlers. RUTH GILBERT, M.D., and MARION B. COLEMAN, Division of Laboratories and Research, State Department of Health, Albany, N. Y.

Value of Duodenal Aspiration in Diagnosis of Chronic Fecal Typhoid Carriers. LLOYD ARNOLD, M.D., and LARS GULBRANDSEN, Department of Bacteriology and Preventive Medicine, University of Illinois, College of Medicine, Chicago, Ill.

*Monday, 2:30 P.M.*

## FOOD AND NUTRITION

*First Session—Lincoln Room, Lincoln Hotel*

**Nutrition in the Public Health Program.** LYDIA J. ROBERTS, PH.D., Chairman, Department of Home Economics, University of Chicago, Chicago, Ill.

**Nutrition and Family Food Budgets.** LUCY GILLET, Association for Improving the Condition of the Poor, New York, N. Y.

**Pellagra.** W. H. SEBRELL, National Institute of Health, Washington, D. C.

**Dietary Investigations Bearing on Pellagra.** MARGARET R. SANDELS, PH.D., Educator, Teaching and Investigations in Nutrition, Florida State College for Women, Tallahassee, Fla.

**Theory of the Etiology of Pellagra.** J. C. NORRIS, M.D., Associate Professor of Pathology and Public Health, Emory University, Atlanta, Ga.

**Vitamin G Deficiency.** PAUL R. DAY, M.D., School of Medicine, University of Arkansas, Little Rock, Ark.

**Report of the Committee on Nutrition.** *Chairman,* PROFESSOR HENRY C. SHERMAN, Department of Chemistry, Columbia University, New York, N. Y.

## PUBLIC HEALTH ENGINEERING SECTION AND CONFERENCE OF STATE SANITARY ENGINEERS

*Joint Session—Palm Room*

*Presiding:* L. F. WARRICK, *Chairman,* Conference of State Sanitary Engineers.

**When Are Milk Containers and Equipment Clean and Sterile?** (Report of the Committee on Milk Supplies). *Chairman,* C. A. HOLMQUIST, Director, Division of Sanitation, State Department of Health, Albany, N. Y.

**Report of the Joint Committee on Rural Sanitation.** *Chairman,* H. E. MILLER, Special Expert, U. S. Public Health Service, Norfolk, Va.

**The Sanitary Works of Indianapolis.** C. K. CALVERT, Sanitary District of Indianapolis, Indianapolis, Ind.

*Discussion.* L. A. GEUPEL, Chief Engineer, Department of Sanitary Engineering, State Board of Health, Indianapolis, Ind.

**Present Status of the Program of the Tri-State Treaty Commission on Abatement of Pollution of Harbor and Coastal Waters within the (N. Y.) Metropolitan Area.** F. S. TANTER, Engineer, New York, N. Y.

*Discussion.* C. A. HOLMQUIST, Director, Division of Sanitation, State Department of Health, Albany, N. Y.

*Monday, 6:30 P.M.*

## PUBLIC HEALTH EDUCATION

*Dinner Session—Louis XV Parlor*

*Closed Session—for Fellows and Members of the Section only*

*Section Business.*

Monday, 8:00 P.M.

## FIRST GENERAL SESSION

*Riley Room*

Invocation.

Address of Welcome. WILLIAM F. KING, M.D., Chairman of the Local Committee, Indianapolis, Ind.

Address of the President of the American Public Health Association. America's Contributions and Problems in Public Health. JOHN A. FERRELL, M.D., Associate Director, International Health Division, The Rockefeller Foundation, New York, N. Y.

Announcement of Awards.

Reception and Dancing.

Tuesday, 9:30 A.M.

## INDUSTRIAL HYGIENE

*Second Session—Club Room*

Poisoning by Petroleum Distillates—Case Reports. EMERY R. HAYHURST, M.D., PH.D., Consulting Industrial Hygienist, Columbus, O.

Treatment of Cyanide Poisoning. K. K. CHEN, PH.D., CHARLES L. ROSE and G. H. A. CLOWES, PH.D., Lilly Research Laboratories, Indianapolis, Ind.

Dermatitis in the Oil Refining Industry. LOUIS SCHWARTZ, M.D., U. S. Public Health Service, New York, N. Y.

Visual Disturbances Due to Carbon Tetrachloride—Case Reports. ZOLTON T. WIRTSCHAFTER, M.D., Medical Consultant, State Federation of Labor, Cleveland, O.

Conducted Tour of the Exhibits.

## PUBLIC HEALTH EDUCATION

*First Session—Lincoln Room, Lincoln Hotel*

### THE ORGANIZATION OF ADULT GROUPS FOR HEALTH EDUCATION

In Cities. MARY P. CONNOLLY, Director, Division of Health Education, Department of Health, Detroit, Mich.

In Rural Districts. W. W. PATTY, M.D., Director, Physical Welfare Training Department, Indiana University, Indianapolis, Ind.

## PUBLIC HEALTH ENGINEERING

*First Session—Palm Room*

### SYMPOSIUM ON PUBLIC HEALTH ENGINEERING PROBLEMS OF LARGE COMMUNITIES

The Growth of American Cities. HOWARD W. GREEN, Secretary, Cleveland Health Council, Cleveland, O.

Keeping Up with the Demand for Adequate Pure Water. HARRY E. JORDAN, Filtration Engineer, Indianapolis Water Company, Indianapolis, Ind.

*Tuesday, 9:30 A.M.*

## PUBLIC HEALTH ENGINEERING (Cont.)

*First Session—Palm Room*

**Liquid Wastes: Their Treatment and Disposal.** LANGDON PEARSE, Sanitary Engineer, Sanitary District of Chicago, Chicago, Ill.

**Practical Application of Milk Control.** J. R. JENNINGS, Chief, Milk Control Division, Department of Public Health, Louisville, Ky.

**Can Refuse Collection and Disposal Systems Be Improved?** H. P. EDDY, JR., Metcalf and Eddy, Boston, Mass.

**The Air We Breathe and the Sounds We Hear.** JOEL I. CONNOLLY, Board of Health, Chicago, Ill.

**Mosquitoes Have No Place in a City.** RALPH E. TARBETT, Sanitary Engineer, U. S. Public Health Service, Washington, D. C.

*Section Business.*

## HEALTH OFFICERS, LABORATORY AND EPIDEMIOLOGY SECTIONS

*Joint Session—Assembly Room*

### SYMPOSIUM: WHAT ARE THE ESSENTIALS OF TYPHOID FEVER CONTROL TODAY?

*Presiding:* ROBERT H. RILEY, M.D., *Chairman*, Health Officers Section; WADE H. FROST, M.D., *Chairman*, Epidemiology Section; and RUTH GILBERT, M.D., representing the Laboratory Section.

*For the Epidemiology Section—*GEORGE H. RAMSEY, M.D., Director, Division of Communicable Diseases, State Department of Health, Albany, N. Y.

*For the Health Officers Section—*A. J. CHESLEY, M.D., Executive Officer, State Board of Health, St. Paul, Minn.

*For the Laboratory Section—*E. O. JORDAN, PH.D., Department of Hygiene and Bacteriology, University of Chicago, Chicago, Ill.

*Discussion.* WILLIAM H. PARK, M.D., Director, Bureau of Laboratories, Department of Health, New York, N. Y.; D. F. MILAM, M.D., Epidemiologist, State Department of Health, Raleigh, N. C.; and L. L. LUMSDEN, M.D., U. S. Public Health Service, New Orleans, La.

*Conducted Tour of the Exhibits.*

## CHILD HYGIENE

*First Session—Travertine Room, Lincoln Hotel*

(Special invitation extended to members of the American Association of School Physicians)

### NEW AND INTERESTING DEVELOPMENTS IN THE CHILD HEALTH FIELD

**Health Education in the Virgin Islands.** SALLY LUCAS JEAN, Health Consultant, New York, N. Y.

*Discussion.* PAULINE BROOKS WILLIAMSON, Chief, School Health Bureau, Welfare Division, Metropolitan Life Insurance Company, New York, N. Y.

*Tuesday, 9:30 A.M.*

### CHILD HYGIENE (Cont.)

*First Session—Travertine Room, Lincoln Hotel*

Some Public Health Aspects of Maternal Mortality. **FRANCES C. ROTHERT**, M.D., Associate Medical Officer, U. S. Children's Bureau, Washington, D. C.

Coördination of Nursery School and Public Health Nursing Service. **GENEVA F. HOIJEN**, R.N., Director, Albany Guild for Public Health Nursing, Albany, N. Y.

*Discussion.* **HUNTINGTON WILLIAMS**, M.D., Commissioner of Health, Baltimore, Md.

Motivating Teacher Participation in New Type Health Activity. **RUTH HEAVENRIDGE**, Teacher-Director, Special Classes for Indianapolis Public Schools, Indianapolis, Ind.

*Discussion.* **AMELIA T. WOOD**, Director, Health Service, Ball State Teachers' College, Muncie, Ind.

*Tuesday, 12:30 P.M.*

### INDUSTRIAL HYGIENE

*Luncheon Session—Chateau Room*

Report of the Committee on Standard Practices in the Problem of Compensation of Occupational Diseases. *Chairman*, **HENRY H. KESSLER**, M.D., State Department of Labor, Newark, N. J.

Report of the Committee on Pneumoconiosis. *Chairman*, **R. R. SAYERS**, M.D., U. S. Bureau of Mines, Washington, D. C.

*Tuesday, 2:30 P.M.*

### PUBLIC HEALTH NURSING

*First Session—Assembly Room*

#### THE CONTRIBUTION OF PUBLIC HEALTH NURSING TO VARIOUS PHASES OF THE PUBLIC HEALTH PROGRAM

To Communicable Disease Control. **MARGUERITE A. WALES**, R.N., General Director of Nurses, Henry Street Settlement Visiting Nurse Service, New York, N. Y.

*Discussion.* **LOUISE KUCK TOOKER**, R.N., Superintendent of Nurses, Department of Health, Cincinnati, O.

To the School Age Group. **MARION G. RANDALL**, R.N., Division of Research, Milbank Memorial Fund, New York, N. Y.

To the Maternity, Infancy and Preschool Age Group. **AGNES G. TALCOTT**, R.N., Director of Nurses, Department of Health, Los Angeles, Calif.

How to Make Public Health Nursing Fit into a Budget. **ALMA C. HAUPT**, R.N., Associate Director, National Organization for Public Health Nursing, New York, N. Y.

*Tuesday, 2:30 P.M.*

## PUBLIC HEALTH ENGINEERING

*Second Session—Palm Room*

**Effect of Economic Conditions on Public Health Engineering Work.**  
MALCOLM PIRNIE, Civil Engineer, New York, N. Y.

*Discussion.*

**A View of Environmental Sanitation in the Control of Communicable Diseases.**  
WADE H. FROST, M.D., School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

*Discussion.* ARTHUR E. GORMAN, Engineer of Water Purification, Department of Public Works, Chicago, Ill.

**Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pool Waters.** A. H. FLETCHER, Director, Bureau of Sanitation, Department of Health, Memphis, Tenn., and E. C. LINK, Director, Bureau of Laboratories, State Department of Health, Nashville, Tenn.

**A Hypochlorite Feeding Device.** F. R. SHAW, Sanitary Engineer, U. S. Public Health Service, Chicago, Ill.

## VITAL STATISTICS

*Second Session—Club Room*

**Has Diabetes Become More Prevalent?** CHARLES BOLDUAN, M.D., Director of Health Education, Department of Health, New York, N. Y.

**Death Rates from Puerperal Septicemia in Large Cities, 1922 to 1929.**  
GARUS B. HARMON, M.D., Associate Professor of Hygiene, School of Medicine, Western Reserve University, Cleveland, O.

## DISCUSSION OF REGISTRATION PROBLEMS

**Adjustment of Vital Statistics Divisions to Depression Budgets.**

*Discussion opened by:* W. THURBER FALES, Sc.D., State Registrar, State Board of Health, Montgomery, Ala., and CARL E. BUCK, Dr.P.H., Field Director, American Public Health Association, New York, N. Y.

*Section Business.* Election of Officers.

## PUBLIC HEALTH EDUCATION

*Second Session—Lincoln Room, Lincoln Hotel*

### RETAILING HEALTH INFORMATION AND IDEAS

**Campaign Plans for Thorough Coverage of a Given City.**

**A Plan to Increase Understanding of the Value of Scientific Medicine.**  
T. J. EDMONDS, Executive Secretary, Iowa Tuberculosis Association, Des Moines, Ia.

**Reaching the Negro Community.** M. O. BOUSFIELD, M.D., First Vice-President and Medical Director, Supreme Liberty Life Insurance Company, Chicago, Ill.

**Outline for a Social Hygiene Educational Campaign.** MARGARET WELLS WOOD, American Social Hygiene Association, New York, N. Y.

*Discussion.*

*Tuesday, 2:30 P.M.*

## LABORATORY AND FOOD AND NUTRITION SECTIONS

*Joint Session—Riley Room*

### SYMPOSIUM ON MICROBIOLOGICAL EXAMINATION OF FOOD PRODUCTS

*Presiding:* CARL R. FELLERS, PH.D., *Chairman*, Food and Nutrition Section, and ROBERT S. BREED, PH.D., *Vice-Chairman*, Laboratory Section.

Need for Uniform Practices in the Microbiological Examination of Food Products. LAWRENCE H. JAMES, PH.D., Food Research Division, U. S. Bureau of Chemistry and Soils, Department of Agriculture, Washington, D. C.

Factors Involved in the Microbiological Examination of Canned Foods. E. J. CAMERON, PH.D., Bacteriologist, National Cannery Association, Washington, D. C.

The Examination of Fermented Foods by Laboratory Methods. CARL S. PEDERSON, PH.D., Bacteriologist, New York State Agricultural Experiment Station, Geneva, N. Y.

The Microbiological Examination of Fresh and Frozen Fruits and Vegetables. F. W. TANNER, PH.D., Department of Bacteriology, University of Illinois, Urbana, Ill.

The Need for Methods for the Bacteriological Examination of Crustacea. A. C. HUNTER, PH.D., U. S. Food and Drug Administration, Department of Agriculture, Washington, D. C.

Suggested Laboratory Procedures for Use in Determining the Cause of Food Poisonings. S. A. KOSER, PH.D., Department of Hygiene and Bacteriology, University of Chicago, Chicago, Ill.

*Tuesday, 6:30 P.M.*

## FOOD AND NUTRITION

*Dinner Session—Chateau Room*

*Section Business.*

## PUBLIC HEALTH ENGINEERING

*Joint Dinner—Travertine Room, Lincoln Hotel*

Public Health Engineering Section and Conference of State Sanitary Engineers. Annual Engineers' Stag Dinner Party. Toastmaster—"BILL" ORCHARD, Wallace & Tiernan Company, Newark, N. J.

*Tuesday, 7:00 P.M.*

## PROFESSIONAL EDUCATION

*Dinner Session—Riley Room*

*Presiding:* W. S. LEATHERS, M.D., *Chairman*, Committee on Professional Education.

Policies and Objectives of the Committee on Professional Education. W. S. LEATHERS, M.D., School of Medicine, Vanderbilt University, Nashville, Tenn.

Elements Involved in Determining the Qualifications of Health Officers. E. L. BISHOP, M.D., State Commissioner of Public Health, Nashville, Tenn.



*Tuesday, 7:00 P.M.*

## PROFESSIONAL EDUCATION (Cont.)

*Dinner Session—Riley Room*

**Qualifications and Training of Local Health Officers.** THOMAS PARRAN, JR., M.D., State Commissioner of Health, and DON M. GRISWOLD, M.D., State Department of Health, Albany, N. Y.

*Discussion opened by:* A. W. FREEMAN, M.D., Professor of Public Health Administration, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

*Wednesday, 9:30 A.M.*

## CHILD HYGIENE

*Second Session—Travertine Room, Lincoln Hotel*

(Special invitation extended to members of the American Association of School Physicians)

### CHILD HEALTH DURING DEPRESSION YEARS—ECONOMIC ASPECTS

**What Economies Can Be Made in Programs with Least Detriment to the Health of the Children?** CARL E. BUCK, DR.P.H., Field Director, American Public Health Association, New York, N. Y.

**Effect on Mental Health of Children.** HENRY SCHUMACHER, M.D., Director, Child Guidance Clinic, Cleveland, O.

**Effect on Physical Health of Children.** MARTHA ELLIOT, Children's Bureau, Washington, D. C.

**The Health and Growth of School Children During the Depression.** ESTELLA F. WARNER, M.D., Surgeon, U. S. Public Health Service, Washington, D. C.

## LABORATORY

*Second Session—Medical Sub-Session—Chateau Room*

### SYMPOSIUM ON FILTERABLE VIRUSES

*Presiding:* ANNA W. WILLIAMS, M.D., *Chairman*, Laboratory Section.

**Rabies Vaccine Protection Tests.** JOHN REICHEL, V.M.D., and J. E. SCHNEIDER, Mulford Biological Laboratories, Glenolden, Pa.

**Serological Studies on Vaccinia in Smallpox.** RALPH S. MUCKENFUSS, Department of Bacteriology, School of Medicine, Washington University, St. Louis, Mo.

**Cultivation of "Vaccine Virus" in Vitro.** CHARLES R. TYLER and CAROLYN OLDENBUSCH, Department of Health Laboratories, New York, N. Y.

**Purification of Vaccine Virus.** MORRIS SHAEFFER, HELEN NALIBOW and ANNA GOLDBERG, New York University School of Medicine, New York, N. Y.

Wednesday, 9:30 A.M.

### LABORATORY (Cont.)

*Second Session—Medical Sub-Session—Chateau Room*

Mechanism of Bacteriophage Lysis. J. BRONTENBRENNER, PH.D., D.P.H., Department of Bacteriology, School of Medicine, Washington University, St. Louis, Mo. (*Motion Picture Illustrations and Stereopticons.*)

The Relation of Filterable Viruses to the Pneumonias Complicating Measles, Influenza and Whooping Cough. H. A. MCCORDOCK, Department of Bacteriology, School of Medicine, Washington University, St. Louis, Mo.

Discussion of the Work on Postvaccinal Encephalitis and Tetanus. Discussion of Smallpox. CHARLES ARMSTRONG, M.D., National Institute of Health, Washington, D. C.

### PUBLIC HEALTH ENGINEERING

*Third Session—Palm Room*

Chlorination in Sewage Disposal (Report of the Committee on Sewage Disposal). *Chairman*, LANGDON PEARSE, Sanitary Engineer, Sanitary District of Chicago, Chicago, Ill.

Report of the Committee on Fellowship and Membership. *Chairman*, LINN H. ENSLOW, Editor, *Water Works and Sewerage*, New York, N. Y.

Effect of Chemical Constituents in Water on the Human System (Report of the Committee on Water Supply). *Chairman*, J. R. BAYLIS, Physical Chemist, Department of Public Works, Chicago, Ill.

Fly Trapping. A. P. HITCHENS, Major, Medical Corps, U. S. Army, Fort Sheridan, Ill. (*Stereopticon Illustration.*)

Report of the Committee on Noise. *Chairman*, C. R. COX, Associate Sanitary Engineer, State Department of Health, Albany, N. Y. (To be read by title only.)

Report of the Committee on Promotion of Environmental Sanitation. *Chairman*, V. M. EHLERS, Chief Sanitary Engineer, State Department of Health, Austin, Tex. (To be read by title only.)

Conducted Tour of the Exhibits.

### FOOD AND NUTRITION

*Second Session—Club Room*

The Proposed Federal Food and Drugs Act: Its Public Health Features. WALTER S. FRISBIE, Chemist, U. S. Food and Drug Administration, Department of Agriculture, Washington, D. C.

Sleep Motility as a Measure of the Effect of Different Types of Foods and Beverages on Nervousness. MELVILLE GIDDINGS, M.D., Professor of Medicine, Emory University, Atlanta, Ga.

New Mechanism of Defense Against Bacteria Through Use of Certain Foods. LLOYD ARNOLD, M.D., College of Medicine, University of Illinois, Chicago, Ill.

The Significance of Copper and Iron as Blood Restorers. C. A. ELVEHJEM, PH.D., University of Wisconsin, Madison, Wis.

Wednesday, 9:30 A.M.

## FOOD AND NUTRITION (Cont.)

*Second Session—Club Room*

The Present Status of Vitamin Standards. E. M. NELSON, PH.D., Nutritionist, Bureau of Chemistry, U. S. Department of Agriculture, Washington, D. C.

Report of the Committee on Foods. *Chairman*, WALTER H. EDDY, PH.D., Teachers College, Columbia University, New York, N. Y.

Conducted Tour of the Exhibits.

## EPIDEMIOLOGY

*Second Session—Assembly Room*

Tracing of Transmission of Syphilis. DUDLEY C. SMITH, M.D., and WILLIAM A. BRUMFIELD, M.D., Department of Syphilology and Dermatology, University of Virginia, Charlottesville, Va. (*Stereopticon Illustration.*)

The Epidemiological Aspects of Tuberculosis Control in Massachusetts. ALTON S. POPE, M.D., Director, Division of Tuberculosis, and GEORGE H. BIGELOW, M.D., State Commissioner of Public Health, State Department of Health, Boston, Mass. (*Stereopticon Illustration.*)

Newer Aspects in the Prevention and Control of Scarlet Fever with a Report of 60,000 Complete Immunizations. JOHN L. JONES, M.D., Epidemiologist, State Board of Health, Louisville, Ky.

The Period of Isolation for Scarlet Fever. JOHN E. GORDON, M.D., Director, Division of Epidemiology, Herman Kiefer Hospital, and GEORGE F. BADGER, Assistant to the Epidemiologist, Department of Health, Detroit, Mich. (*Stereopticon Illustration.*)

Exposure as a Factor in the Age Distribution of Measles, Diphtheria and Poliomyelitis. W. LLOYD AYCOCK, M.D., Assistant Professor, Preventive Medicine and Hygiene, Harvard Medical School, Boston, Mass.

## VITAL STATISTICS AND PUBLIC HEALTH EDUCATION SECTIONS

*Joint Session—Riley Room*

### NEWS VALUES IN HEALTH STATISTICS

*Presiding:* MARY SWAIN ROUTZAHN, *Chairman*, Public Health Education Section.

Does the Press Want Health Statistics? GEORGE H. VAN BUREN, Supervisor, Statistical Bureau, Metropolitan Life Insurance Company, New York, N. Y.

Local Publicity Use of Statistics from National and State Sources. H. J. SHELLEY, M.D., Health Officer, Middletown, N. Y.

Safeguards in Publicity Uses of Statistics. A. W. HEDRICH, Sc.D., Associate in Biostatistics, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

*Discussion.*

Conducted Tour of the Exhibits.

Wednesday, 9:30 A.M.

### PUBLIC HEALTH NURSING

*Second Session—Lincoln Room, Lincoln Hotel*

#### TEAM-PLAY BETWEEN PUBLIC HEALTH NURSES AND THE MEDICAL PROFESSION

W. W. BAUER, M.D., Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, Ill.

*Discussion.* M. LOUISE NICOL, R.N., District Supervising Nurse, Division of Child Hygiene and Public Health Nursing, State Department of Public Health, Springfield, Ill.

#### THE USE OF LAYMEN IN OFFICIAL PUBLIC HEALTH NURSING PROGRAMS

City. J. D. DOWLING, M.D., County Board of Health, Birmingham, Ala.

County. MRS. A. L. BLACKSTONE, Chairman, Waukesha County Health Committee, and Chairman, Committee on Public Welfare, State Federation of Women's Clubs, Waukesha, Wis.

State. MRS. ARCH TRAWICK, President, State Federation of Women's Clubs, Nashville, Tenn.

*Discussion.*

Wednesday, 12:30 P.M.

### LABORATORY

*Luncheon Session—Chateau Room*

*Section Business.*

### CHILD HYGIENE

*Luncheon Session—Travertine Room, Lincoln Hotel*

*Section Business.*

### PUBLIC HEALTH EDUCATION

*Luncheon Session—Riley Room*

*An Experience Meeting*

*Wednesday, 6:30 P.M.*

## SECOND GENERAL SESSION

*Banquet—Riley Room*

### MEMORIAL SESSION TO DR. WALTER REED AND HIS ASSOCIATES ON THE YELLOW FEVER COMMISSION

In commemoration of the notable work which made possible the conquest of yellow fever and which was first announced by Dr. Reed at the American Public Health Association meeting in 1900, the Annual Banquet will be a memorial session with fitting exercises and ceremonies. The Surgeon-General of the United States Army, Major General Robert U. Patterson, and Dr. Frederick F. Russell, Director of the International Health Division, The Rockefeller Foundation, will speak.

*Thursday, 9:30 A.M.*

## LABORATORY

*Third Session\*—Milk Sanitation Sub-Session—Palm Room*

(Special Invitation Extended to Members of the International Association of Dairy and Milk Inspectors.)

*Presiding:* ROBERT S. BREED, PH.D., *Vice-Chairman*, Laboratory Section.

**Studies on Acidophilus Therapy.** C. N. STARK, PH.D., New York State College of Agriculture, Ithaca, N. Y.

**Streptococci Found in Bovine Udders.** G. J. HUCKER, PH.D., and P. ARNE HANSEN, New York State Agricultural Experiment Station, Geneva, N. Y.

**Microbiological Methods for the Analysis of Butter.** E. H. PARFITT, Milk Inspector, Dairy Department, Purdue University, Lafayette, Ind.

### SYMPOSIUM ON STANDARD METHODS FOR THE BACTERIOLOGICAL EXAMINATION OF MILK

**Bacterial Analysis of Ice Cream.** F. W. FABIAN, PH.D., Michigan State College of Agriculture and Applied Science, East Lansing, Mich.

**Methods of Examining Dairy Products for Members of the Escherichia-Aerobacter Group.** M. H. MCCRADY, Chief of Laboratories, Provincial Bureau of Health, Montreal, Que.

**A Comparative Study of Yeast and Beef Extract Media for Use in Routine Milk Control Work.** C. S. BOWERS, Department of Health, New Britain, Conn.

**The Effect of the Temperature of Incubators upon the Agar Plate Count in Routine Control Work.** M. W. YALE, PH.D., and CARL S. PEDERSON, PH.D., Bacteriologist, New York State Agricultural Experiment Station, Geneva, N. Y.

**Discussion.** ROBERT S. BREED, PH.D., Referee, Chief in Research, New York State Agricultural Experiment Station, Geneva, N. Y.

---

\* Fourth Session—Medical Sub-Session—meeting concurrently in Club Room.

Thursday, 9:30 A.M.

## LABORATORY

*Fourth Session\*—Medical Sub-Session—Club Room*

*Presiding:* ANNA W. WILLIAMS, M.D., *Chairman, Laboratory Section.*

Report of a Series of Cough Plate Examinations for *Hemophilus pertussis*. PEARL KENDRICK, Sc.D., and GRACE ELDERING, State Department of Health Laboratories, Western Michigan Division, Grand Rapids, Mich.

Human Immunization with Tetanus Toxoid. D. H. BERGEY, M.D., Dr.P.H., Professor of Hygiene and Bacteriology, University of Pennsylvania, and S. ETRIS, Philadelphia, Pa.

Vaccine for Immunization Against Smallpox Prepared from Chicken Embryo Cultures. JULIA M. COFFEY, Division of Laboratories and Research, State Department of Health, Albany, N. Y.

Report of the Association Committee to Study the Efficacy of Typhoid Vaccines. T. F. SELLERS, M.D., State Department of Health, Atlanta, Ga.

The Isolation from Typhoid Fever Patients and Typhoid Carriers of Strains Which Have Properties Corresponding to Those of Certain Variants of *B. Typhosus*. RUTH GILBERT, M.D., and MARION B. COLEMAN, State Department of Health, Albany, N. Y.

Relationship of *Shigella Alkalescens* to Other Members of the *Shigella* Group. HENRY WELCH, Ph.D., Research Biologist, and FRIEND LEE MICKLE, Director, Bureau of Laboratories, State Department of Health, Hartford, Conn.

Production of Antitoxins by Means of Bacteriophage. N. W. LARKUM, Ph.D., Immunologist, State Department of Health, Lansing, Mich.

The Pathogenicity of Certain Species of *Monilia* for Laboratory Animals. W. D. STOVALL, M.D., State Hygienic Laboratory, Madison, Wis.

Practical Method for Public Health Laboratory Diagnosis of Infectious Syphilis. HERBERT E. MCDANIELS, Research Laboratories, State Department of Public Health, Chicago, Ill.

A Survey of One Thousand *Gonococcus* Complement-Fixation Tests Performed with the Serums of Female Patients in an Outpatient Clinic. WALTER M. BRUNET, M.D., and B. S. LEVINE, Ph.D., Urological Division and the Clinical Laboratory, Public Health Institute, Chicago, Ill.

\* Third Session—Milk Sanitation Sub-Session—meeting concurrently in Palm Room.

## HEALTH OFFICERS

*Third Session—Assembly Room*

The Evaluation of Various Procedures in Diphtheria Control. HERMAN N. BUNDESEN, M.D., President, Board of Health, Chicago, Ill.

*Discussion.* JAMES ROBERTS, M.D., Medical Officer of Health, Hamilton, Ont.

Developments in Health Administration in the Province of Quebec. ALPHONSE LESSARD, M.D., Director, Provincial Bureau of Health, Quebec, Que.

Medical Participation in the Program of the W. K. Kellogg Foundation. STUART PRITCHARD, M.D., Battle Creek, Mich.

The Sanitary Supervision of Food Handling Establishments. SEVERANCE BURPAGE, Associate Professor, Department of Bacteriology and Public Health, University of Colorado, Denver, Colo.

*Thursday, 9:30 A.M.*

CHILD HYGIENE SECTION, AMERICAN SOCIAL HYGIENE  
ASSOCIATION AND AMERICAN ASSOCIATION OF  
SCHOOL PHYSICIANS

*Joint Session—Chateau Room*

CONGENITAL SYPHILIS

*Presiding:* THURMAN B. RICE, M.D., Professor of Bacteriology and Pathology, Indiana University, School of Medicine, Indianapolis, Ind.

*Medical Aspects.* P. C. JEANS, M.D., Department of Pediatrics, University of Iowa Medical School, Iowa City, Ia.

*What Can Be Done Regarding Congenital Syphilis Among School Children?* DON W. GUDAKUNST, M.D., Director, School Health Service, Department of Health, Detroit, Mich.

*The Prevention of Congenital Syphilis.* JAMES R. MCCORD, M.D., Department of Obstetrics and Gynecology, Emory University School of Medicine, Atlanta, Ga.

*Discussion.* WALTER CLARKE, M.B., Director, Division of Medical Measures, American Social Hygiene Association, New York, N. Y.

PUBLIC HEALTH ENGINEERING SECTION AND THE CENTRAL  
STATES SEWAGE WORKS ASSOCIATION

*Joint Session—Riley Room*

*Presiding:* C. K. CALVERT, *Chairman*, Central States Sewage Works Association.

*Recent Advances in the Chemical Treatment of Sewage.* F. W. MOHLMAN, Director of Laboratories, Sanitary District of Chicago, Chicago, Ill.

*Sewage Sludge Gas Utilization.* C. E. KEEFER, Bureau of Sewers, Department of Public Works, Baltimore, Md.

*Mechanization of Sewage Treatment Works.* E. B. BESSELEVRE, Sanitary Engineer, The Dorr Company, New York, N. Y.

*The Treatment of Trade Wastes.* L. F. WARRICK, State Sanitary Engineer, State Board of Health, Madison, Wis.

VITAL STATISTICS

*Third Session—Empire Room*

*The Economic Depression and Health and Sickness in Families of the Unemployed in Ten Cities.* G. ST. J. PERROTT, Consultant, and SELWYN D. COLLINS, PH.D., Senior Statistician, U. S. Public Health Service, Washington, D. C.

*Have You Used Your 1930 Census Data to the Fullest Extent?* MARY V. DEMPSEY, Washington, D. C.

*Brief Announcements of Recent Work and Problems.*

*Display of a Convenient Cumulative Index to U. S. Vital Statistics.* J. V. DEPORTE, PH.D., Director, Division of Vital Statistics, State Department of Health, Albany, N. Y.

Thursday, 9:30 A.M.

## VITAL STATISTICS (Cont.)

*Third Session—Empire Room*

Some Adventures as a Registration Consultant in Roumania. W. THURBER FALES, Sc.D., State Registrar, State Board of Health, Montgomery, Ala.

Residence Allocation Studies in Ohio. P. G. BECK, University of Ohio, Columbus, O.

Occupational Mortality. JESSAMINE S. WHITNEY, Statistician, National Tuberculosis Association, New York, N. Y.

A Post-mortem of the 1933 Vital Statistics Meetings. Suggestions for Future Programs.

Discussion opened by: GEORGE H. VAN BUREN, Supervisor, Statistical Bureau, Metropolitan Life Insurance Company, New York, N. Y.

Thursday, 2:30 P.M.

## LABORATORY

*Fifth Session—Sanitation Sub-Session—Chateau Room*

### WATER AND SEWAGE

Presiding: M. H. MCCRADY, Chief of Laboratories, Provincial Bureau of Health, Montreal, Que.

Differential Reactions in the Colon Group of Bacteria. MAX LEVINE, PH.D., S. S. EPSTEIN, and R. H. VAUGHN, Department of Bacteriology, Iowa State College, Ames, Ia.

Open Forum on Standard Methods for Detection of Members of Coli-Aerogenes Groups of Organisms in Water.

Discussion Opened by: C.-E. A. WINSLOW, DR.P.H., Yale University, New Haven, Conn.

Some Observations on the Germicidal Efficiency of Chloramine-T. D. B. CHARLTON and MAX LEVINE, PH.D., Department of Bacteriology, Iowa State College, Ames, Ia.

## INDUSTRIAL HYGIENE

*Third Session—Club Room*

Occupational Disease Legislation. ANDREW J. FARRELL, Attorney-at-Law, Chicago, Ill.

Pulmonary Asbestosis. JOHN DONNELLY, M.D., Superintendent, Mecklenburg Sanatorium, Huntersville, N. C.

Flight Fatigue. WADE HAMPTON MILLER, M.D., Medical Examiner, Department of Commerce, Aeronautics Branch, Lieutenant Commander, Medical Corps, U. S. Naval Reserve, Flight Surgeon, Kansas City, Mo.

Thorium as a Hazard in Roentgenology. R. POMERANZ, M.D., Associate Roentgenologist, Beth Israel Hospital, Newark, N. J.

A New X-Ray Mass-Procedure for the Discovery of Early Tuberculosis in Industry. MARGARET W. BARNARD, M.D., Medical Director, Bellevue-Yorkville Health Demonstration, New York, N. Y.



*Thursday, 2:30 P.M.*

## FOOD AND NUTRITION SECTION AND INTERNATIONAL ASSOCIATION OF DAIRY AND MILK INSPECTORS

*Joint Session—Riley Room*

*Presiding:* CARL R. FELLERS, PH.D., *Chairman*, Food and Nutrition Section, and HORATIO N. PARKER, *President*, International Association of Dairy and Milk Inspectors.

**Natural and Induced Variations in the Vitamin Values of Milk.** PROFESSOR HENRY C. SHERMAN, Department of Chemistry, Columbia University, New York, N. Y.

**Report of the Committee on Food Value of Milk** (International Association of Dairy and Milk Inspectors). IRA V. HISCOCK, Professor of Public Health, Yale University, New Haven, Conn.

**Report of the Committee on Inter-state Shipment of Cream** (International Association of Dairy and Milk Inspectors). H. E. BREMER, State Department of Agriculture, Montpelier, Vt.

**Report of the Committee on Milk and Dairy Products** (American Public Health Association). *Chairman*, WILLIAM B. PALMER, Milk Inspection Association of the Oranges, Orange, N. J.

**The Quality of Milk Pasteurized by High-Temperature, Short-Time and 30-Minute Holding Methods.** M. W. YALE, PH.D., New York State Agricultural Experiment Station, Geneva, N. Y.

**Chlorine Sterilizers in Dairies** (International Association of Dairy and Milk Inspectors). M. J. PRUCHA, PH.D., Professor of Dairy Bacteriology, University of Illinois, Urbana, Ill.

## PUBLIC HEALTH EDUCATION

*Third Session—Travertine Room, Lincoln Hotel*

**IS THERE A COMMON OBJECTIVE IN PUBLIC EDUCATION AROUND WHICH  
ALL HEALTH ORGANIZATIONS CAN RALLY?**

*A Panel Session.*

*Foreman of the Jury:* C.-E. A. WINSLOW, DR.P.H., Yale University, New Haven, Conn.

*Jurymen:*

H. E. KLEINSCHMIDT, M.D., Director, Health Education, National Tuberculosis Association, New York, N. Y.

LEWIS H. CARRIS, Managing Director, National Society for the Prevention of Blindness, New York, N. Y.

WILLIAM F. SNOW, M.D., General Director, American Social Hygiene Association, New York, N. Y.

HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

MARJORIE DELAVAN, Director, Bureau of Education, State Department of Health, Lansing, Mich.

BLEECKER MARQUETTE, Executive Secretary, Public Health Federation, Cincinnati, O.

Thursday, 2:30 P.M.

PUBLIC HEALTH NURSING SECTION, INDIANA STATE NURSES  
ASSOCIATION AND INDIANA LEAGUE OF  
NURSING EDUCATION

*Joint Session—Assembly Room*

*Presiding:* BEATRICE GERRIN, R.N., Superintendent of Nurses, Indianapolis City Hospital Nursing School, Indianapolis, Ind., and ELSEBETH H. VAUGHAN, R.N., *Chairman*, Public Health Nursing Section.

QUALITY NURSING

Good Health as a Factor. JOHN SUNDWALL, M.D., Director, Division of Hygiene and Public Health, University of Michigan, Ann Arbor, Mich.

*Discussion.*

The Undergraduate Curriculum as a Factor. MARY BEARD, R.N., Associate Director, International Health Division, Rockefeller Foundation, New York, N. Y.

*Discussion.*

THE SECOND INSTITUTE ON HEALTH EDUCATION

DR. IAGO GALDSTON, *Director*

Under the auspices of the Public Health Education Section

Theme: "The Psychology of Health Education."

*Arrangement:* There will be five sessions; Saturday morning, Saturday afternoon, Sunday morning, Sunday afternoon and Monday morning. Morning sessions begin at 9 and end at 12; afternoon sessions begin at 2 and end at 5. Three of the sessions will be didactic conferences concerning:

- a. Why the psychology of health education?
- b. The psychologic nature of the recipient of health education
- c. Fundamental principles relative to:
  1. Arresting attention
  2. Enlisting sympathy
  3. Imparting information
- d. Meaning and mechanism of motivation
- e. Practical demonstrations; the application of the outline of psychologic principles to health education instruments; the spoken text, the printed text and graphic material.

*Round Table, Clinic:* One session will be a "round table" with the student body forming three separate groups. The students will be given an opportunity to practise evaluating material which they as a body have brought, along principles indicated. Each group will hold a conference on a definite amount of assigned material. Each group will have a reporter who will deliver to the student body as a whole the judgment of the round table at the final clinic session. The reporters will participate with the teaching staff in evaluating the educational material submitted.

*Teaching Staff:* The teaching staff consists of Dr. IAGO GALDSTON, New York Academy of Medicine, Dr. H. E. KLEINSCHMIDT, National Tuberculosis Association, BERTRAND BROWN, Milbank Memorial Fund, and the student body.

*Enrollment:* Any person engaged full time or part time in health education activities is eligible for enrollment in the Institute, upon application to the office of the American Public Health Association and upon payment of the Institute fee of \$5.00. The Institute faculty reserves the right to limit enrollments to sixty, applications to be accepted in the order received. Every participant in the Institute will be required to submit educational material for review and analysis. Such material may be finished pieces of work or lay-outs and plans in preparation.

## MEETINGS OF OTHER ORGANIZATIONS

## CONFERENCE OF STATE SANITARY ENGINEERS

All day Saturday, October 7, Palm Room.

Monday A.M., Palm Room.

Monday P.M., Joint Session with the Public Health Engineering Section, Palm Room.

Tuesday Evening, Annual Engineers' Stag Dinner Party, Travertine Room, Lincoln Hotel.

## AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

For complete program see pages 970 and 971.

## MUNICIPAL SANITATION EDITORIAL BOARD

Monday Noon, Luncheon, English Parlor.

## ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Monday Evening, Dinner Session, Chateau Room

The Annual informal dinner of the Association of Women in Public Health will occur October 9, 1933, at the Claypool Hotel in the Chateau Room.

Detailed information will be available at the registration desk.

It is hoped that members arriving early for sessions of the American Public Health Association will visit the Florentine Room in the Claypool Hotel, where the organization will have informal headquarters. There are a number of important questions to be discussed and formulated for presentation at the dinner meeting.

A committee on future policies and plans, Dr. Mary Lakeman, Chairman, will be glad to have your suggestions, as will the nominating committee.

Officers of the Association aided by a local committee will give all possible assistance.

You are asked to obtain your dinner ticket at the A.P.H.A. registration desk, on your arrival, to facilitate arrangements. As members will wish to attend the First General Session of the American Public Health Association, it will be necessary to arrive promptly at the hour given on the card. A pleasant surprise is planned for the dinner.

## MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Tuesday, 8 A.M., Breakfast, Louis XV Parlor.

## DELTA OMEGA

## NATIONAL COMMITTEE OF HEALTH COUNCIL EXECUTIVES

Tuesday Noon, Luncheon, English Parlor.

## JOHNS HOPKINS UNIVERSITY ALUMNI

Wednesday, 8 A.M., Breakfast.

## AMERICAN JOURNAL OF PUBLIC HEALTH

## AMERICAN SOCIAL HYGIENE ASSOCIATION

Thursday A.M., Joint Session with the Child Hygiene Section and American Association of School Physicians, Chateau Room.

## CENTRAL STATES SEWAGE WORKS ASSOCIATION

Thursday A.M., Joint Session with the Public Health Engineering Section, Riley Room.

## INTERNATIONAL ASSOCIATION OF DAIRY AND MILK INSPECTORS

Thursday P.M., Joint Session with the Food and Nutrition Section, Riley Room.

Friday and Saturday, October 13 and 14.

## INTERNATIONAL SOCIETY OF MEDICAL HEALTH OFFICERS

## SIXTH ANNUAL MEETING

## AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

*(Unless otherwise indicated, all sessions will be held in the Roof Garden of the Hotel Severin)*

*Monday, 9:30 A.M.*

Joint Session with the Public Health Nursing and Child Hygiene Sections of the American Public Health Association

*Riley Room, Claypool Hotel*

*(For Program see page 951)*

*Monday, 2:00 P.M.*

## AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Address of the President of the American Association of School Physicians.  
J. BRUCE McCREARY, M.D., Deputy State Secretary of Health, Harrisburg, Pa.

## MEDICAL LEADERSHIP IN HEALTH SERVICE

By State Medical Societies. R. R. FERGUSON, M.D., Illinois State Medical Society, Chicago, Ill., and THOMAS P. FARMER, M.D., New York State Medical Society, Syracuse, N. Y.

By Educational Authorities. A. O. DEWEESE, M.D., Director of Health, Kent State Normal College, Kent, O., and W. D. GATCH, M.D., Indiana University School of Medicine, Indianapolis, Ind.

What Qualifications Should the Director of School Health Education and School Health Service Have? FREDERICK L. PATRY, M.D., Neuropsychiatrist, State Education Department, Albany, N. Y.

Discussion. JOHN SUNDWALL, M.D., University of Michigan, Ann Arbor, Mich.

*Tuesday, 12:15 P.M.*

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS AND INTERNATIONAL  
SOCIETY OF MEDICAL HEALTH OFFICERS

*Joint Luncheon Session*

A Close-Up of Some Aspects of School Medical Inspection (A Preliminary statement on the results of a study of physical defects and the reasons for non-correction in the schools in New York City). RAYMOND FRANZEN, PH.D., Research Director of the Study, American Child Health Association, New York, N. Y.

*Discussion.* HAVEN EMERSON, M.D., Member of Advisory Committee of the Study, New York, N. Y.

*Tuesday, 2:00 P.M.*

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS  
SCHOOL MEDICAL INSPECTION AND HEALTH SERVICE

In Honolulu. FRED K. LAM, M.D., Honolulu, T. H.

In LaSalle, Illinois. ARLINGTON AILES, M.D., Hygienic Institute, LaSalle, Ill.

Annual Medical Examination for Teachers. J. L. DELAMATER, M.D., St. Joseph, Mo., and H. W. FUDGE, M.D., Elmira, N. Y.

Mental Hygiene Child Guidance by a Part-Time Psychiatrist. HAROLD S. HULBERT, M.D., School Psychiatrist for Gary and East Chicago, Ind.

Prevalence and the Permanence of Defective Hearing as It Exists in School Children. WALTER S. CORNELL, M.D., Director of Medical Inspection, Philadelphia, Pa.

*Wednesday, 2:00 P.M.*

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS AND INTERNATIONAL  
SOCIETY OF MEDICAL HEALTH OFFICERS

*Joint Session*

Childhood Tuberculosis Up to Now. J. A. MYERS, M.D., Department of Public Health, Minneapolis, Minn., and WALTER RATHBUN, M.D., Cassadaga, N. Y.

*Discussion.* JAMES A. KEENAN, Boston, Mass.

State Chapters of American Association of School Physicians. J. M. QUIGLEY, M.D., Clearfield, Pa.

The Factor Body Width Plays in Height, Weight, Age (Preliminary Report). C. L. OUTLAND, M.D., School Medical Director, Richmond, Va.

*Thursday, 9:30 A.M.*

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Joint session with the Child Hygiene Section of the American Public Health Association and the American Social Hygiene Association.

*Travertine Room, Lincoln Hotel*

(For Program see page 965)

INDIANA STATE NURSES ASSOCIATION AND INDIANA LEAGUE  
OF NURSING EDUCATION

The program for these meetings, to be held on October 12, 13, and 14, lists some interesting topics and speakers.

Their joint session on Thursday afternoon with the Public Health Nursing Section is given on page 968 of this JOURNAL. The subject of the General Session on Friday morning is "Quality Nursing." It will be treated from three angles—the hospital, the public health field, and the home. GRACE ROSS, Director of Nursing Service of the Detroit Department of Health, will speak for the public health nurse.

One of the round table luncheons scheduled for Thursday noon will be presided over by BEATRICE SHORT, *Chairman* of the Public Health Section. The topic for discussion is "What Can Be Done Next Year in Indiana to Further the Interest of Public Health Nurses as a Professional Group?" ALMA HAUPT, Associate Director, National Organization for Public Health Nursing, will present the paper.

At the general session on Friday afternoon, DR. J. A. MEYERS will talk on "Tuberculosis Case Finding," and DR. FRANK L. RECTOR on "Cancer." At a dinner that evening, CLARA D. NOYES, Director of the Nursing Service, American Red Cross, is to be the speaker.

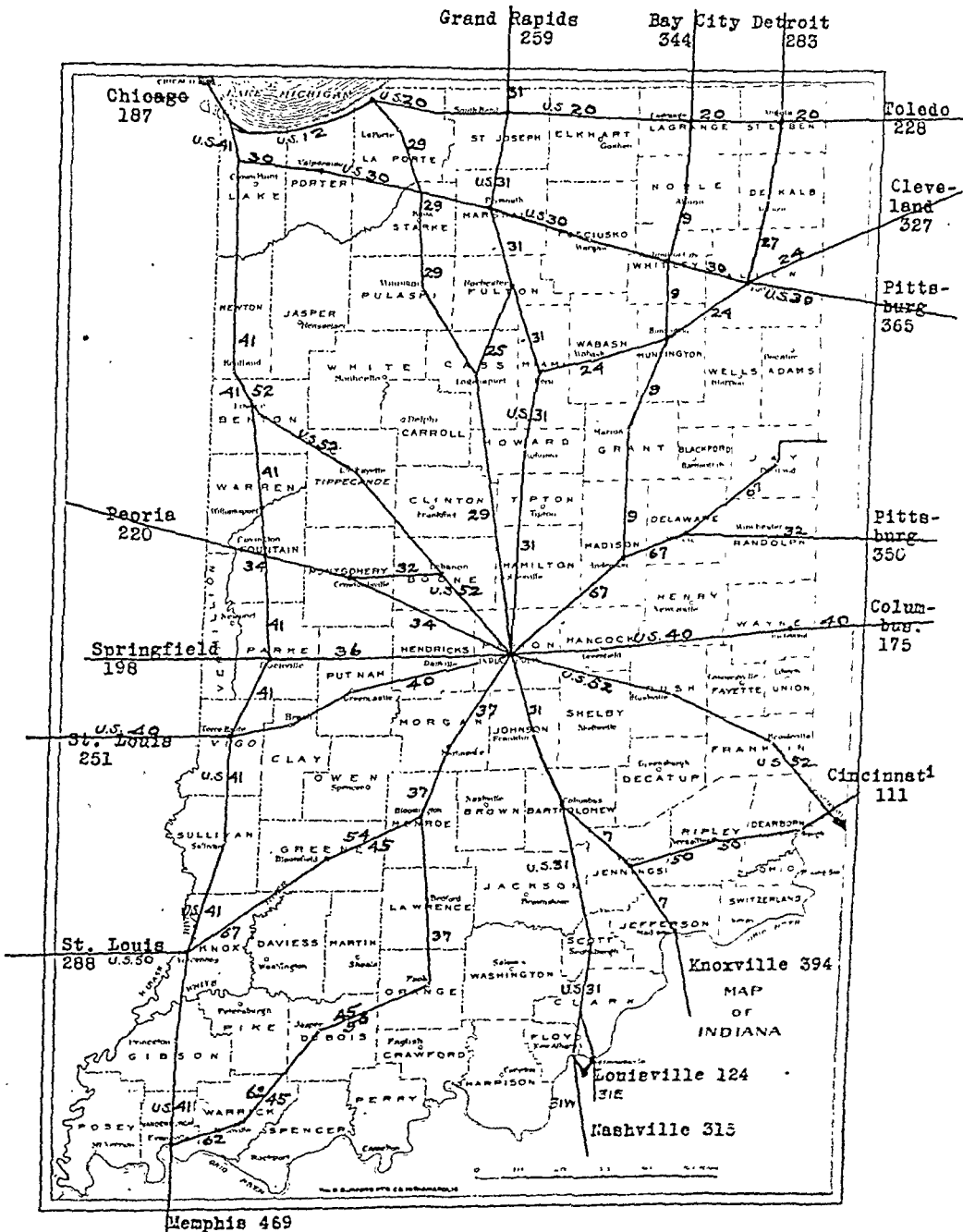
Saturday morning will be taken up with committee and section reports and an address on "Present Problems and Needs of Indiana" by the President of the Indiana State Nurses' Association, LULU V. CLINE.

Members of the American Public Health Association are invited to attend the sessions.

# ASSOCIATION NEWS

Main Indiana Highways to Indianapolis  
with road numbers indicated

MARGIN FIGURES INDICATE MILEAGES FROM INDIANAPOLIS



## DID YOU ATTEND THE INDIANAPOLIS ANNUAL MEETING IN 1900?

ONE of the outstanding events of our Indianapolis meeting this year, as has been mentioned before, is the Memorial Session to Dr. Walter Reed and his associates on the Yellow Fever Commission.

Dr. William F. King, our host at Indianapolis, is assembling a list of present members of the Association who attended the Annual Meeting in 1900. Letters have been sent to members on the membership list for the year 1900; but it is possible that the old records are not entirely accurate and that some

who are members now and were present at the meeting when Dr. Reed read his famous paper joined after that year.

If you attended the Indianapolis Annual Meeting in 1900, please notify the Association office. Any memories you have of the occasion will be helpful, particularly if you were so fortunate as to hear Dr. Reed. If you are planning to attend the Indianapolis meeting this year, please indicate that as well, so you may be paid some honor, too, when the Association meets in banquet session on Wednesday evening, October 11.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.*

*Health Officers Section*

- Joseph F. Bredeck, M.D., D.P.H., Municipal Courts Bldg., St. Louis, Mo., Health Commissioner  
 Claude W. Chamberlain, Ph.D., 6124 Cermak Road, Cicero, Ill., Assistant Superintendent of Social Hygiene, Division of Communicable Diseases, State Department of Health  
 Francis B. Galbraith, M.D., 2226 Santa Clara Ave., Alameda, Calif., Health Officer  
 Verne K. Harvey, M.D., C.P.H., State House Annex, Indianapolis, Ind., Director, Division of Public Health, Indiana State Department of Commerce and Industry  
 William H. Oates, B.Sc., M.D., 402-1st National Bank Annex, Mobile, Ala., Member of Board of Health of Mobile County  
 Tan Poh Seong, M.D.H., Kuala Belait, Brunei, S. S., Health Officer (Assoc.)  
 George L. Stivers, M.D., Belmont Hospital, Worcester, Mass., Medical Director, Belmont Hospital

*Laboratory Section*

- Chester S. Bowers, B.S., Board of Health Laboratory, City Hall, New Britain, Conn., Director of Laboratory  
 Harold M. B. Lineback, M.S. in P.H., 1537 Cone St., Toledo, Ohio, Bacteriologist

*Vital Statistics Section*

- Ruth R. Puffer, A.B., State Department of Health, Nashville, Tenn., Statistician

*Public Health Engineering Section*

- J. G. Beacham, B.S.C.E., P. O. Box 522, Athens, Ga., City Engineer and Superintendent of Water Works  
 Charles G. Gifford, M.S., 203 Standard Life Bldg., Pittsburgh, Pa., Dairy Inspector

*Food and Nutrition Section*

- Harry A. Fritschman, 2325 Darby Road, Upper Darby, Pa., Secretary Board of Health, Haverford Township

*Child Hygiene Section*

- Solomon L. Hermany, M.D., Bowmanstown, Carbon Co., Pa., School Medical Inspector, Palmerton Public Schools  
 Harry J. Wieler, M.A., The Hotchkiss School, Lakeville, Conn., Medical Director

*Public Health Education Section*

- Elwood C. Davis, Ph.D., Pennsylvania State College, State College, Pa., Head of Department of Professional Health and Physical Education  
 Margaret H. Jeffreys, 2 Walnut St., Crafton, Pa., Dental Hygienist



George T. Wilhelm, University of Tennessee,  
Knoxville, Tenn., Professor of Hygiene and  
Director, Department of Student Health  
Frank B. Wisner, B.S., M.D., Springfield Hos-  
pital, Springfield, Mass., Student (Assoc.)

*Public Health Nursing Section*

Emma T. Higgins, R.N., P. O. Box 195,  
Waukesha, Wis., County Nurse  
Clodia E. Johnson, R.N., Hart, Mich., County  
Nurse  
Maude D. Smith, R.N., 969 N. Marengo Ave.,  
Pasadena, Calif., School Nurse  
Reba L. Bess, R.N., Box 645, Keyser, W. Va.,  
County Nurse

*Epidemiology Section*

W. Arkell Browne, M.D., 416 City Hall Annex,  
Richmond, Va., Epidemiologist, Bureau of  
Health

*Unaffiliated*

Charles W. Bonyng, M.D., 840 W. 37th St.,  
Los Angeles, Calif., Director Laboratories,  
Los Angeles County Medical Commission  
Raymond D. Fear, M.D., Dr.P.H., 52 South  
St., Stamford, Conn., Health Commissioner  
Arthur E. McClue, M.D., State Health Dept.,  
Charleston, W. Va., State Health Commis-  
sioner

ADDITIONAL APPLICANTS FOR FELLOWSHIP

HEALTH OFFICERS SECTION

James William Bass, M.D., Dallas, Texas  
Lloyd Moffitt, M.D., Yakima, Wash.

LABORATORY SECTION

George D. Beal, Phar.D., Ph.D., Pittsburgh,  
Pa.  
Archie H. Robertson, M.S., Ph.D., Albany,  
N. Y.

FOOD AND NUTRITION SECTION

Lawrence W. Bass, Ph.D., New York, N. Y.  
Francis Lowell Burnett, M.D., Boston, Mass.  
Ray William Clough, Ph.D., Seattle, Wash.  
Merrick J. Mack, Amherst, Mass.  
Harry W. von Loesecke, B.S., Winter Haven,  
Fla.

PUBLIC HEALTH ENGINEERING SECTION

Warren H. Booker, C.E., Raleigh, N. C.  
Levi L. Hedgepeth, B.S., Philadelphia, Pa.  
J. R. Jennings, B.S., Louisville, Ky.

PUBLIC HEALTH EDUCATION SECTION

Katherine Z. W. Whipple, A.M., New York,  
N. Y.

PUBLIC HEALTH NURSING SECTION

Sarah R. Addison, R.N., Hartford, Conn.  
Naomi Deutsch, R.N., San Francisco, Calif.  
Mary E. Edgecomb, Englewood, N. J.  
Alma C. Haupt, R.N., New York, N. Y.  
Arline R. Mansfield, B.S., Easton, Pa.  
Marion W. Sheahan, R.N., Albany, N. Y.

# PUBLIC HEALTH ADMINISTRATION

**Dairy and Milk Inspectors' Training Course**—The growing interest in self-improvement developed by sanitary inspectors of the Los Angeles County Health Department has arrived at the point where they are willing to spend their own time and mileage allowance attending classes of instruction. This was evidenced by the attendance at the Dairy and Milk Inspectors' Training Course given under the supervision of the School of Sanitary Instruction from February 7 to May 23, 1933. Classes were held every Tuesday evening from seven to nine at the East Side Health and Welfare Center, with the exception of three weeks when the entire inspection group was on earthquake emergency duty. Field trips were taken in the evenings or on Saturdays. The scope of the course was limited to the actual operations which a dairy and milk inspector performs, the contributing knowledge being distributed in pamphlet form.

The object of the training program was (1) to standardize procedure, (2) prepare inspectors to pass the approval examination given by the State Department of Agriculture, and (3) for general information. There were nine dairy and milk inspectors and eighteen senior sanitary inspectors who attended classes, twenty-two of whom completed the course and took the final oral and written examination. In addition to the regular class, there were twelve to twenty-eight visitors at each session, the latter merely listening in and taking no part in the discussions, five minute questions, or home work. Some of the inspectors and visitors had to travel a total distance of seventy miles to the Health Center which was a good indication of their interest. This getting-

together of inspectors with state control officials has proven of immense benefit in clarifying dairy inspection procedure and in developing a high morale within the inspection force (a complete list of the subjects discussed will be provided upon request).—Walter S. Mangold, Sanitary Instructor, Los Angeles County Health Department.

**Distribution of Dysentery**—To distinguish this disease from the common intestinal affections the dysenteric syndrome is defined as being constituted essentially by the presence of abdominal pains, frequent mucous and bloody stools with painful straining and tenesmus. This syndrome may be produced by infection either by *Entamoeba histolytica* or by one of the numerous known forms of *B. dysenteriae*. In the search for amoebiasis a single examination cannot prove with certainty the absence or presence of the amoeba. A single examination may disclose only 44 per cent of carriers while as many as six examinations may be required to uncover 100 per cent of carriers.

A statistical study has been made of the prevalence of dysentery in all sections of the world. Statistics have been gathered from registered cases, from death records, from military and hospital records and other sources. Dysentery appears even in places with a severe climate. For a long time it was thought that amoebic dysentery was the dominating, if not the only, form encountered in the tropical and sub-tropical zones, and that, on the other hand, bacillary dysentery was the only form that occurred in the temperate zones. The increasing use of laboratory methods for the etiological diag-

nosis of the forms of dysentery, and for finding germ carriers, has brought about a change in these traditions. Amoebic dysentery is particularly prevalent in tropical regions but to a lesser degree the *Entamoeba histolytica* is widespread in temperate climates. Bacillary dysentery is not limited to the temperate zone but may even be the predominant type of infection in tropical regions.—*League of Nations Epidemiological Report*, Apr., 1933.

**Bellevue-Yorkville Health District**—The sixth annual report of the Bellevue-Yorkville health demonstration for 1932 is a document of 68 pages, well mimeographed and interestingly written. The health department's first clinic for preschool children was opened here in 1927, later followed by similar services elsewhere in the city. The first official consultation chest service for private physicians was established in 1929 and the department now operates seven others. A pneumothorax refill service, established in the health center in 1931, has been extended to other sections of the city. A diagnostic cardiac clinic for children, a generalized nursing service, a mental hygiene unit, and a dental service for children are among the other projects which are described.

Of recognized value, too, are the quarterly and yearly compilations and special studies, prepared by the Demonstration's division of records, of vital statistics for the 25 sanitary areas comprising its district. A record of the prevalence of diseases, so localized, makes possible greater efficiency in the direction of preventive activity by the Center.

Health education applying to adults as well as children, living or working in the area has been a feature of the health center work. Expenditures of the Demonstration, besides those of the department of health for medical nursing services, amounted to \$81,647, which was contributed by the Milbank Memorial Fund.

**Whooping Cough Vaccination**—Many authorities feel that if vaccine is given early in the catarrhal stage some good will be effected but when used in the convulsive stage little effect can be expected. There has not been sufficient distinction between the use of whooping cough vaccination for therapeutic and prophylactic purposes. The Faroe Islands, due to their isolation, have long afforded a splendid opportunity for the study of the epidemiology of communicable diseases. Favorable results with vaccination are reported. The vaccine used was made from young strains; the dose was rather large, a total of 22,000 million bacteria; the vaccination was completed shortly before the onset of an epidemic. The mortality in the vaccinated group of nearly 4,000 individuals was but one-sixteenth of the mortality in the non-vaccinated group which included approximately 1,000 individuals. The groups were quite comparable with respect to age, time of epidemic and surrounding conditions. — Thorvald Madsen, *Vaccination Against Whooping Cough*, *J.A.M.A.* 101, 189 (July 15), 1933.

# LABORATORY

## LABORATORY AIDS IN THE DIAGNOSIS AND SERUM THERAPY OF PNEUMOCOCCUS PNEUMONIA

ALBERT B. SABIN, M.D.

*Department of Bacteriology and Immunology, New York University and  
Bellevue Hospital Medical College, New York, N. Y.*

FOR centuries the diagnosis of pneumonia has been made on the basis of certain well known clinical features. However, from the standpoint of prognosis, serum therapy, and epidemiology, the simple clinical diagnosis of pneumonia with its anatomic differentiation into lobar and broncho-pneumonia, has come to be regarded as incomplete without the determination of the etiologic agent. We present recent methods for establishing the etiologic diagnosis and discuss laboratory aids for the control of serum therapy.

Of the pneumococci which are the infecting organisms in about 95 per cent of the pneumonias, approximately 90 per cent fall into 32 distinct and definite types.<sup>1</sup> Of the specific antisera which have thus far been investigated, only Type I serum has been shown to be of definite value, and Type II to have a beneficial effect when administered during the first 3 days of the disease. The value of sera against some of the recently classified types is being studied. Although specific therapy is thus limited, it is nevertheless important to carry routine determinations through all the classified types of pneumococci, not only as an aid to prognosis, but also, epidemiologically, to supply data as to the relative incidence of the various types in different parts of the world. For this latter reason it would also be advisable to make pneumonia reportable not merely as "lobar" or "broncho"—but with a complete etiologic diagnosis as well.

The determination of the infecting organism may be accomplished in four ways: (1) by the isolation of the organism; (2) by the demonstration in sputum, urine, or blood of the specific products of its growth; (3) by the rate of agglutinin neutralization in cases receiving polyvalent serum; and (4) by the specific immune bodies which the patient develops during convalescence.\* The isolation of the organism is commonly attempted from the blood by culture, and from the sputum preferably by mouse inoculation. When, as in certain adult patients, and particularly in children, sputum cannot be obtained, one may incubate a throat swab in broth for 2-3 hours, and then inject the broth into a mouse. Although many reliable methods for typing pneumococci have been introduced, I shall confine myself to the microscopic method which I described in 1929<sup>2</sup>; it has since been widely used and found to be rapid, reliable, and particularly useful in the differentiation of all known types of pneumococci on account of the small quantities of antigen and serum required.

The method is as follows: Three to 4 hours after mouse inoculation with a good sample of sputum there are usually sufficient pneumococci in the peritoneal

\* Since this paper was read in October, 1932, a method of pneumococcus typing directly from the sputum has been introduced and found to be perhaps the most rapid, simple, and practical of any employed thus far.

Sabin, A. B. Immediate Pneumococcus Typing Directly from Sputum by the Neufeld Reaction. *J.A.M.A.*, 100:1584-1586 (May 20), 1933.

exudate to permit a microscopic test. The mouse is not killed, the exudate being drawn off with a glass capillary tube. Drops of the exudate are mixed with drops of a 1:10 dilution of the various typing sera; after drying, the smears are stained and examined with the oil immersion lens. A positive reaction is indicated by a clumping of the pneumococci in one of the smears (Figure I). In performing a complete typing for all the 32 types, the sera may be combined into 8 groups; for example, Group A may contain the sera of Types I-IV in final dilution of 1:10 or 1:20; Group B, sera Types V-VIII, etc. When agglutination occurs in one of the groups, 4 smears are made with the constituent sera of that group, to determine the one type; with no clumping in any of the groups, the pneumococcus is termed unclassified. Sometimes, agglutination is observed in more than one group or type serum, and it is then necessary to repeat smears with higher dilutions (1:20, 1:40, 1:60, etc.) of the sera in question, until only one serum produces agglutination. After death of the mouse it is well to confirm the type by a culture of the heart's blood.

When, as occasionally happens, more than one type of pneumococcus is isolated, it is important to keep the cultures until the patient convalesces, if he does, and then test the patient's blood against these cultures; the type that is agglutinated by the patient's blood is the one that most likely was the infecting organism. Only when more than one is specifically agglutinated by the convalescent blood, is a mixed infection definitely established.

When sufficient sputum is available, and if it is coagulable, in addition to mouse inoculation a Krumwiede test should be tried, since when it is definitely positive it is the most rapid and reliable of all methods. In severe cases it is worth while to do a precipitin test on a clear sample of urine.

*Microscopic Typing of Blood Cultures*—If the growth is not sufficiently heavy in the original culture, the broth is centrifuged, and the sedimented organisms then suspended in a little of the supernatant fluid. Typing is performed with this suspension.

*Microscopic Typing of Spinal and other Pneumococcus-Infected Fluids*—In pneumococcus meningitis, there are

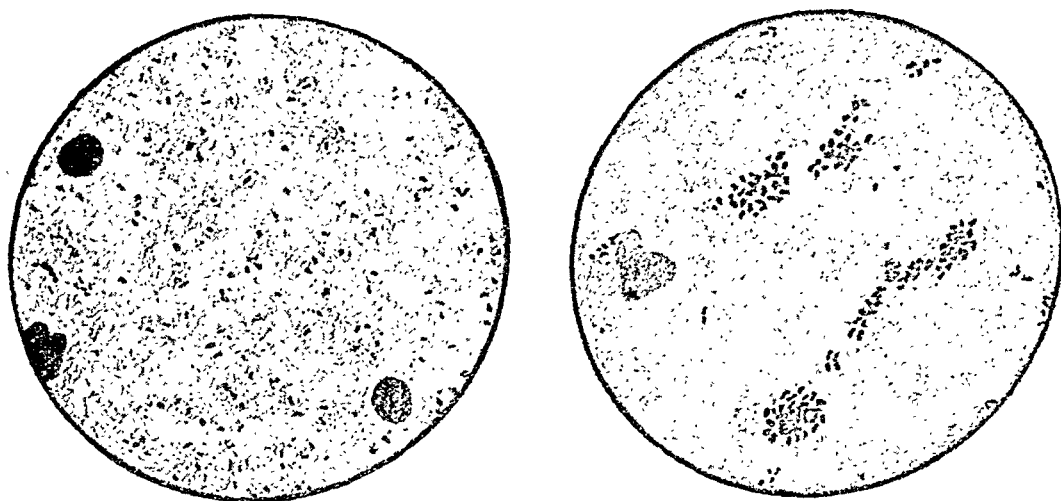


FIGURE I—MICROSCOPIC AGGLUTINATION IN STAINED SLIDE TYPING METHOD (SABIN). (Left) Mouse peritoneal exudate mixed with heterologous type serum. No agglutination of pneumococci; (Right) Same mixed with homologous type serum. Observe agglutination of pneumococci.

Acknowledgment: The author is indebted to Dr. Jesse G. M. Bullock for the use of these figures.

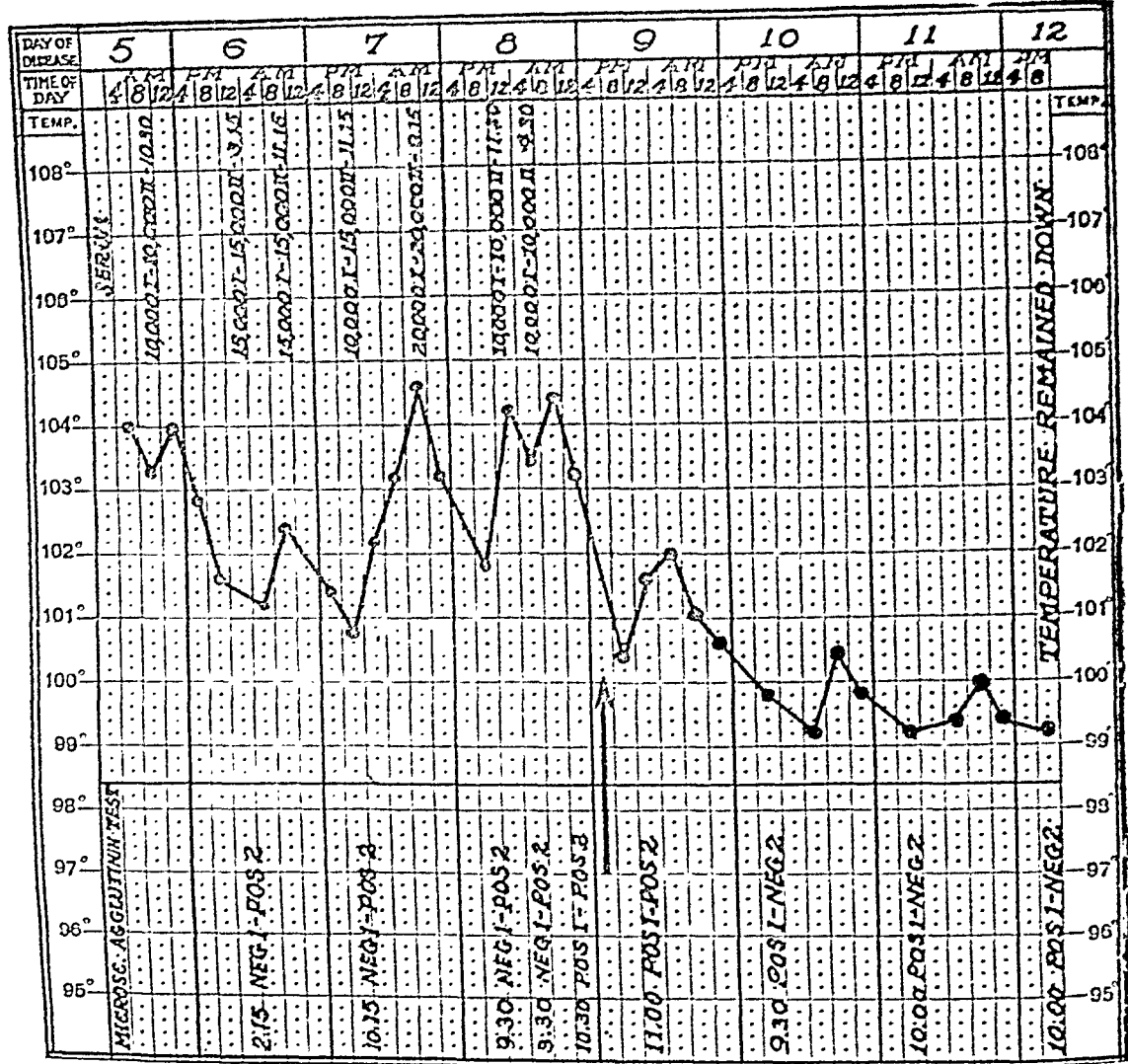


CHART 1—Reaction of a patient with Type I pneumonia (negative blood culture) to serum therapy; neg 1—pos 2 refers to the absence of Type I and the presence of Type II pneumococcus agglutinins in the patient's blood at the time indicated; pos 1—pos 2 refers to the presence of both; 10,000 I, 10,000 II indicates the number of units of Type II and of Type II protective antibody contained in the dose of polyvalent serum.

usually sufficient organisms in the spinal fluid to permit a direct typing by microscopic agglutination, and sometimes by precipitation; otherwise a mouse is injected. With other pneumococcus-infected fluids, the same procedures are used.

The rate of agglutinin neutralization offers a method for determining the type of infecting pneumococcus which although of limited applicability, may be very useful in many instances. It depends upon the observation made by Cole,<sup>3</sup> that homologous antibody injected into a pneumococcus-infected

animal disappears rapidly, whereas heterologous antibody disappears as in a non-infected animal. It thus appears that if a bivalent (Types I and II) antipneumococcic serum were injected into a patient with an active Type I pneumococcus pneumonia, the Type I antibody should disappear more rapidly than Type II. That this is actually so became evident from the agglutinin studies on many patients.<sup>4</sup> Two characteristic cases are shown in Charts I and II. The patients were injected with the bivalent serum and at stated intervals thereafter the presence or absence of agglutinins

in their blood was determined by a rapid microscopic method.<sup>4</sup> In this method two drops of blood are obtained on a slide; one is mixed with a drop of Type I pneumococcus vaccine, and the other with a drop of Type II vaccine. After drying in air, the smears are dehemoglobinized and fixed by immersion into Ruge's solution (2 per cent formaldehyde containing 1 per cent glacial acetic acid) for 20 seconds. After rinsing in water, the preparation is stained. An analysis of Charts I and II reveals that even in the absence of a detectable bacteremia, there is a continued disappearance of the homologous agglutinins until an excess is established in the circulation. It thus appears that this method can be used not only for confirming the type of infecting pneumococcus but also primarily to establish it. In many communities, where 50-60 per cent of all pneumonias are caused by pneumococcus Types I and II, and in the absence of facilities for a rapid determination of type, it seems advisable to administer a certain amount of bivalent

(Types I and II) antipneumococcic serum and 2-3 hours later to perform an agglutination test with the patient's blood. When the infecting pneumococcus is neither Type I nor II, the blood will contain both Type I and II agglutinins; the presence of Type II agglutinins only indicates a Type I infection and *vice versa*. Since the rapid disappearance of homologous agglutinins depends upon the activity of the infection, a very mild infection may not be detected by this method. Similarly, late in the disease, sometimes even a day or two before the crisis, the patient will have produced his own homologous agglutinins, which persist long after the passively introduced heterologous agglutinins have disappeared.

It is of course obvious that the use of this method either for the confirmation or the primary establishment of the type of infection cannot properly be carried out unless the respective agglutinin titres of the bivalent serum are known. Table I shows the agglutinin titres of five concentrated and refined

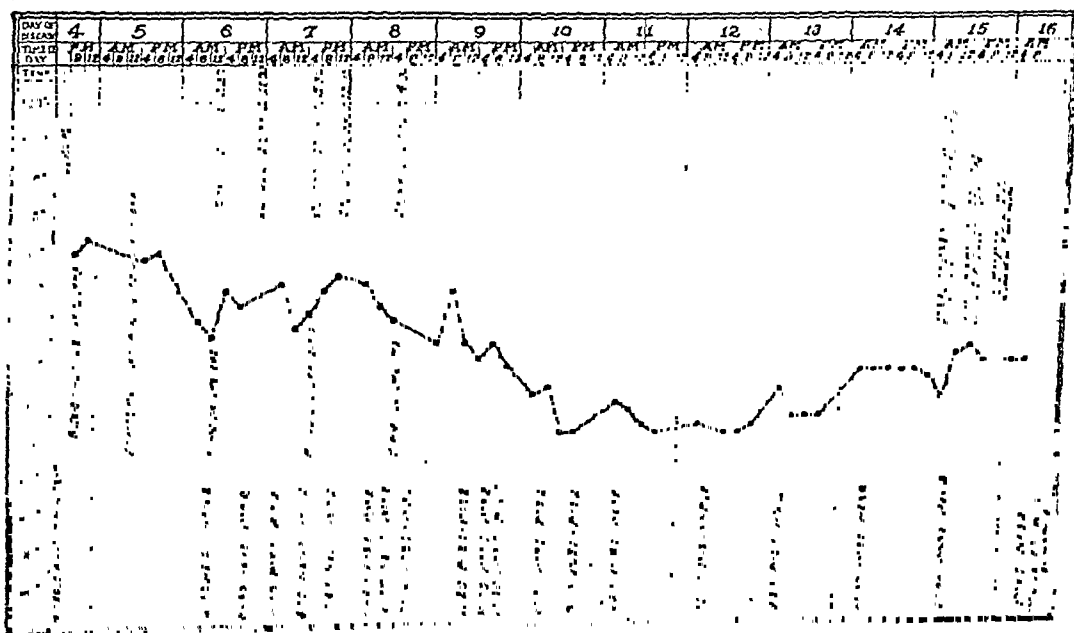


CHART 2—Reaction of a patient with Type I pneumonia (positive blood culture) to serum therapy.

TABLE I  
RELATIONSHIP BETWEEN THE CONTENT OF "PROTECTIVE ANTIBODIES" AND  
AGGLUTININS IN CONCENTRATED SERA

Concentrated Preparation	Protective Units per c.c.		Agglutination of Undiluted Serum with Pneumococcus Type			Last Dilution (Using Horse Serum) Giving Positive Agglutination of Pneumo- coccus Type	
	I	II	I	II	III	I	II
Banzhaf 14-485 .....	< 20	1,000	+	—	+	....	1,000
Banzhaf 36 .....	< 20	2,000	+	—	+	....	1,200
Lederle .....	3,000	1,500	—	—	+	800	1,000
Felton 37 .....	1,500	1,000	—	—	+	400	400
Felton 39 .....	2,000	1,000	—	—	+	400	400
Felton 45B .....	3,000	1,500	—	—	+	800	1,200
Felton 47 .....	3,000	1,000	—	—	+	1,200	1,400

bivalent sera (Types I and II). The important thing to note is the disproportion between the number of mouse protective units and the agglutinin titres for the two types of antibody, and the relatively higher agglutinin content per mouse protective unit of the Type II antibody. The dose of serum which is administered must necessarily contain sufficient agglutinins to render them detectible after their dilution with the body fluids; however, in making this calculation, it has been shown that human blood increases the agglutinin titre of a serum about 2-3 times by a so-called conglutinin effect.<sup>4</sup>

The proper control of the dosage of antipneumococcic serum necessarily depends upon a correct understanding of its therapeutic mechanism. The current opinion is that the action of the serum is purely antibacterial, and that its potency can be correctly expressed in terms of its mouse protective capacity. Recently,<sup>5</sup> I have been able to show that in addition to the antibacterial bodies, standard antipneumococcic sera contain also a so-called "non-antibacterial" factor which plays an important rôle in the defense against pneumococcus infection. It was apparent from this that the standardization of dosage in mouse protective units

was misleading and inaccurate, because an important therapeutic action of the serum was thus disregarded. The standardization of the potency of antipneumococcic serum by its therapeutic effect on the experimental dermal pneumococcus infection in rabbits seems to be considerably more reliable as it measures the antibacterial as well as the non-antibacterial factors.

In a study<sup>6</sup> of the action of specific serum on the Type I pneumococcus dermal infection in rabbits, it was observed that the therapeutic effect did not depend entirely upon either the antibacterial factor, *i.e.*, mouse protective antibody, or the non-antibacterial factor alone. It was further shown that in a minimally effective therapeutic dose, the absolute concentration of either factor was inconstant and varied with the relative concentration of the other; when a relatively larger amount of antibacterial bodies is acting, less of the non-antibacterial factor seems to be necessary and conversely when more of the non-antibacterial factor is available, less of the antibacterial bodies is required. However, to render and maintain the blood stream antibacterial is one of the primary aims of serum therapy. To do this requires widely varying amounts of serum in different



patients depending upon the presence and degree of bacteremia, and the amount of soluble neutralizing substances that are liberated into the circulation. The intact organisms as well as the soluble neutralizing bodies are responsible for the rapid disappearance of the homologous agglutinins. When homologous agglutinins are not demonstrable in the patient's blood, the blood may or may not be antibacterial; when they are demonstrable, however, one can be more certain. It is for this reason, that the microscopic agglutinin test previously described, can be of aid in the control of dosage. When this test is used, sufficient serum must be administered within the shortest possible time to render the patient's blood positive for homologous agglutinins. The quantity of additional serum which is then to be administered should be controlled not only by the amount required to maintain the blood antibacterial, but also by the condition of the patient so that the dose of the non-antibacterial factor may also be adequate. In the experimental disease of rabbits it has been observed that when

they are treated with a dose of serum which contains sufficient antibacterial bodies but an inadequate amount of the non-antibacterial therapeutic factor, most of the rabbits die; the additional injection of an adequate amount of this non-antibacterial factor, however, can save them from death.

## REFERENCES

1. Cooper, G., Rosenstein, C., Walter, A., and Peizer, L. The Further Separation of Types Among the Pneumococci Hitherto Included in Group IV and the Development of Therapeutic Antisera for These Types. *J. Exp. Med.*, 55, Apr., 1932, p. 531.
2. Sabin, A. B. The "Stained Slide" Microscopic Agglutination Test: Application to (1) Rapid Typing of Pneumococci; (2) Determination of Antibody. *Proc. Soc. Exp. Biol. & Chem.*, 26, 1929, pp. 492-494.
3. Cole, R. The Neutralization of Antipneumococcus Immune Bodies by Infected Exudates and Sera. *J. Exp. Med.*, 26, 1917, p. 453.
4. Sabin, A. B. The Microscopic Agglutination Test in Pneumonia: Its Application to Rapid Typing and Control of Serum Therapy. *J. Infect. Dis.*, 46, June, 1930, p. 469.
5. Sabin, A. B. A Study of the Therapeutic Mechanism of Antipneumococcic Serum on the Experimental Dermal Pneumococcus Infection in Rabbits—I. The Presence in Antipneumococcic Serum of a Non-Antibacterial Therapeutic Factor. *J. Exp. Med.*, 56, Oct., 1932, p. 531.
6. Sabin, A. B. A Study of the Therapeutic Mechanism of Antipneumococcic Serum on the Experimental Dermal Pneumococcus Infection in Rabbits—II. A Comparison of the Therapeutic Effect of Unrefined, Antipneumococcic Serum with that of its Various Protein Fractions: The Role of the Non-Antibacterial Factor. *J. Exp. Med.*, 57:139-163 (Jan.), 1933.

## VITAL STATISTICS

Provisional Summary of Mortality from Automobile Accidents in the United States Registration Area, 1932—Provisional figures, issued by the Census Bureau, show that 26,168 deaths from automobile accidents were recorded in 1932 in the death registration area of Continental United States (exclusive of the state of Utah), in comparison with 29,885 deaths in the same area in 1931. The death registration area, comprising 95.9 and 95.8 per cent of the total population of Continental United States in 1932 and 1931 respectively, registered automobile accident mortality rates of 21.9 in 1932 and 25.1 in 1931.

Considering the states by geographic divisions, the Pacific group had the highest death rate in 1932 as well as in 1931, the respective rates being 33.2 and 37.2. Next in order of groups in 1932 are the Mountain (26.6), the East North Central (24.3), and the Middle Atlantic (22.3)—each higher than the rate for the registration area. The groups having the lowest rates were the East South Central (15.0), the West South Central (16.1), and the West North Central (17.6).

Considering the states separately, those with the highest death rates from automobile accidents in 1932 were Nevada (63.4), District of Columbia

(38.7), California (36.9), Arizona (35.7), and Wyoming (34.5), while in 1931 the order was Nevada (68.5), Wyoming (43.0), California (40.5), Florida (34.4), and Arizona (33.6). The lowest mortality rates from this cause in 1932 were for North Dakota (8.3), Mississippi (11.4), Arkansas (13.9), South Dakota (14.1), and New Hampshire (15.0). States with the lowest rates in 1931 were in order of rate—Mississippi (14.0), North Dakota (16.1), South Dakota (16.6), and Oklahoma and Rhode Island (each 16.7).

In the group of 92 cities of 100,000 or more population, there were 8,573 deaths, or a rate of 22.8 per 100,000 population, from automobile accidents in 1932 as compared with 9,825 deaths, or a rate of 26.6 in 1931. The cities which had the highest mortality rates from automobile accidents in 1932 were Camden (65.4), Nashville (45.9), San Diego (41.6), Jacksonville and Tacoma (each 41.5).

The total number of deaths within a city should not be taken as the measure of the automobile hazard. The location of the city, the volume of automobile traffic, the hospital facilities, and other factors, should be considered in connection with the total number of deaths. A better measure of the automobile hazard within a city is the number of fatalities which result from accidents therein. Camden, N. J., serves as an excellent illustration of both of these conditions. Of the 78 deaths in this city due to automobile accidents, only 27 resulted from accidents within the city. The total death rate due to automobile fatalities was 65.4, while that due to accidents within the city of Camden was only 22.7. Similarly Trenton had a total mortality from automobile accidents of 33.0 and a death rate from automobile accidents within the city of 9.7 in 1932; other cities—Nashville with corresponding

rates of 45.9 and 22.9, Reading with 31.3 and 11.6, Wilmington with 33.8 and 16.9, and Richmond with 36.1 and 17.3—also demonstrate the difference between these two death rates.—U. S. Department of Commerce. Bureau of the Census.

**Vital Statistics for Germany in 1932**—Reports of vital statistics for Germany in 1932 show reductions in marriages, live births, stillbirths, general mortality and infant mortality. In view of the great hardships which the country has suffered economically, it is remarkable that the decreases in births and marriages were no greater and that there were reductions in both the general and the infant mortality.

Marriages in Germany during 1932 numbered 509,591 as compared with 515,403 in 1931, the marriage rates being 7.9 and 8.0 respectively. While the marriage rate for 1932 is apparently slightly higher than that for 1913 (7.8) the latter year being considered a normal pre-war year, the figure shows an actual decrease if adjustment is made for the difference in the age distribution of the population in these two years. In 1932, the number of persons of marriageable age was considerably higher than in 1913. If the same proportion of men of marriageable age had married during 1932 as did in 1913, there would have been 610,000 marriages instead of the 509,591 which actually took place that year.

There were 978,161 births in 1932, as compared with 1,031,770 in 1931, which means a reduction of 53,609 in the number of births. Excepting 1917 and 1918, abnormal war years, 1932 was the first year (for which reliable statistics are available) during which the number of births was below one million. The birth rate declined from 16.0 in 1931 to 15.1 in 1932. Stillbirths decreased from 32,153 in 1931 to 29,475 in 1932, although the rate

remained practically the same, 3.1 in 1931 and 3.0 in 1932.

The number of deaths from all causes in 1932 was 697,895 and the death rate 10.8 per 1,000 population, as against 725,816 deaths and a death rate of 11.2 in 1931. Practically the entire reduction of about 28,000 in the number of deaths is accounted for by a lower mortality during the first quarter of 1932 over that of 1931, when an influenza epidemic brought the general death rate considerably above the quarterly average. Statistical data regarding the deaths from different causes in 1932 are not yet available for the whole of Germany. However, according to reports of the causes of death in the municipalities with populations of 15,000 and over, reductions of 9 per 100,000 from influenza and 13 per 100,000 from bronchitis and pneumonia were noted. There were reductions also in the death rates from the communicable diseases of childhood, tuberculosis and accidents, while suicide increased slightly in 1932 over 1931, and the diseases of middle and old age (cancer, diabetes, heart disease and apoplexy) showed somewhat greater increases. Infant mortality decreased from 83 per 1,000 live births in 1931 to 79 in 1932.—*Die Bevölkerungsbewegung im Deutschen Reich im Jahre 1932. Reichsgesundheitsblatt, No. 27, 495-97 (July 5), 1933.*

**A Brief Statistical Analysis of Sanitary Conditions in Porto Rico During the Last Decade\***—During the five years (1923-1927) preceding the San Felipe hurricane, Porto Rico recorded an average general death rate of 21.1 per 1,000 population, the rates in individual years showing fluctuations ranging between 19.4 and 23.4. During the following five years (1928-1932) in the course of which two hurri-

canes occurred, the average death rate was 22.0 per 1,000 population, only 0.9 higher than that for the previous five years; but the annual fluctuations were greater, varying between rates of 25.3 and 18.6. Basically the mortality conditions were similar in the 1923-1927 and the 1928-1932 periods, despite the occurrence of hurricanes in the later five years.

The San Felipe hurricane at the end of 1928 resulted in higher mortality rates for the years 1928 and 1929 followed by the low death rate of 18.6 per 1,000 population in 1930. In 1931, however, the general mortality rose to 20.4, and in 1932, the year of the San Ciprian hurricane, it increased to 22.3. The figures for the first three months of 1933 showed an average death rate of 23.0 (January 23.7; February 23.5; and March 21.9). This experience indicates that the 1933 death rate will be higher than that of the preceding year but lower than that for 1929, the year following the San Felipe hurricane.

Mortality from tuberculosis has climbed almost steadily since 1915 in which year the deaths from this cause numbered 173.3 per 100,000 population. With slight fluctuations, the rise has continued up to 1932 when a maximum rate of 293.7 was registered. The 1932 figure is the first computed under the revised classification of tuberculosis as adopted by the International Commission on Causes of Death in 1929. The wider scope of the 1929 classification partly accounts for the large increase in 1932. Estimates of the number of tuberculous persons in the Island vary between a minimum of 20,000 and a maximum of 40,000. Hospital facilities will accommodate no more than 760 patients, which means that the large majority of tuberculous persons cannot be isolated nor given necessary care. The appropriations of the health department for the control of tuberculosis are also very inadequate.

\* All the figures for 1932 and the first three months of 1933 are preliminary.

A similar situation exists in regard to the control of malaria which has shown no substantial decrease since 1911. In the case of malaria, however, atmospheric conditions bring about rhythmic fluctuations in mortality in cycles of 2, 3, or 4 years. Since 1926, when the rate was 140.2, there have been annual fluctuations culminating with the rate of 203.7 in 1931. Diarrhea and enteritis has shown variable mortality since 1911 with the highest rates being recorded in 1917 (389.4), and in 1928 (314.3). During the San Ciprian hurricane (1932) the rate was 246.9 as compared with 221.6 in 1931.

Compensating factors in the general health situation of Porto Rico are those connected with typhoid fever and diphtheria, two diseases, the control of which comes well within the means of the Island's health authorities. The mortality rate from typhoid fever in 1928 was 30.8; in 1929, 14.5; in 1930, 8.5; in 1931, 6.6; and in 1932, 5.1. Similarly the diphtheria mortality was 6.2 in 1928; 6.0 in 1929; 3.4 in 1930; 3.9 in 1931; and 2.9 in 1932. In both of these diseases the reduction in mortality has been not only constant but very marked, amounting to 83.4 per cent for typhoid fever during the five year period and 53.2 per cent for diphtheria during the same period. The infant mortality has decreased rather consistently since 1911 when the rate was 196 per 1,000 live births; in 1930, the minimum of 126 was reached. This was followed by 130 in 1931 and 132 in 1932.—*Sanitary and Demographic Bulletin of Puerto Rico*. English Supplement. Government of Puerto Rico Department of Health. Year II (May 15), 1933.

**Deaths from External Violence in Canada, 1932**—According to a report issued by the Dominion Bureau of Statistics the number of deaths in Canada from external violence during

the year 1932 (preliminary figures) was 6,611 as compared with 7,172 in 1931 and 7,478 in 1930. The rate per 100,000 population was 63 in 1932 as against 69 in 1931 and 73 in 1930. The death rate from external violence for 1930 was the highest recorded in Canada during the period 1926-1932. The 1932 rate shows a fall of 10 per 100,000 from this peak and 6 per 100,000 from the rate for 1931.

Suicides numbered 1,020 in 1932, as compared with 1,004 in 1931 and 1,010 in 1930. All three of these years showed a marked increase over 1929 when suicides numbered 835. The death rate from suicide was 9.7 in 1932 and 1931, 9.9 in 1930 and 8.3 in 1929.

There were 157 homicides in 1932 giving a rate of 1.5 per 100,000. These figures compared with 172 deaths and a rate of 1.7 in 1931 and 214 deaths and a rate of 2.1 in 1930. The 1930 homicide rate was the highest in the period 1926-1932. In 1926 the rate was 1.3.

The number of deaths resulting from accidents in 1932 was 5,434 and the rate 52 per 100,000, as compared with 5,996 deaths in 1931 giving a rate of 58 and 6,254 deaths in 1930 giving a rate of 61. The 1932 rate was the lowest during the period 1926-1932.

Drownings in 1932, exclusive of those occurring in land or air transportation, numbered 980 or 18 per cent of the total of fatal accidents. Land transportation accounted for 1,586 deaths or 29 per cent of the total. Of these, deaths in automobile accidents numbered 1,111, or 20 per cent of all accidental deaths. Excluding those cases where an automobile was involved, there were 242 deaths in railroad accidents and 44 in street-car accidents. Eleven persons were killed during the year in aeroplane and balloon accidents.—Mimeograph release sheet. Canada Dominion Bureau of Statistics, June 28, 1933.

## PUBLIC HEALTH ENGINEERING

**Jail Sentence for Maintaining Cross Connections**—For several years the Water Department of the City of Los Angeles has waged an energetic campaign against the practice of making cross connections between foreign sources of water supply and the city distributing system. This practice is forbidden by city ordinance No. 66498. It was discovered recently that certain fish companies in the harbor district maintained such cross connections between the city system and their own system, which provided water pumped from the bay. On December 7, 1932, complaints were shown by officials of the water department against four fish companies which maintained these cross connections. In the hearing which followed, the water department traced its vigilance in protecting its own supply and showed how its efforts were nullified through the maintenance of these cross connections. The court imposed jail sentences of fifteen days upon each of the defendants without the alternative of a fine. Subsequently, the sentences were suspended with warnings that future violations would result in more severe sentences not subject to suspension.—Anon., *Weekly Bull.*, California Department of Public Health, XI, 49:195 (Jan. 7), 1933. (From *Pub. H. Eng. Abstr.*, XIII, W, 28, 3-4-33.)

### Why Not Make Garbage Collection and Disposal Self-Sustaining?

—This brief article discusses the feasibility of financing refuse collection and disposal by a service charge or a special tax against the householder, rather than from the general tax levy. Many communities at present make a uniform charge per dwelling for the collection and disposal of refuse. One

possible method is to make a charge according to weight of refuse collected but this is complicated by the necessity of maintaining records and of weighing the refuse. Another method is to have a schedule of rates based upon the size and type of buildings, and still another possible method is to have a schedule of rates based upon the assessed valuation of property. Paying for the collection and disposal of refuse in this way would permit municipalities to receive loans from the Reconstruction Finance Corporation for refuse disposal plants, such as incinerators, on a self-liquidating basis.—Harrison P. Eddy, *Am. City*, XLVII, 4:52-53 (Oct.), 1932. (From *Pub. H. Eng. Abstr.*, XIII, GR, 4, 3-4-33.)

**The First Completely Air Conditioned Theatre in Spokane**—A feature of the system of air conditioning used in the Spokane theatre is the location of the equipment above ground, in a manner to make it visible to passers-by. This design eliminated expensive basement excavation (Spokane is built on solid rock) and serves as an excellent means of advertising the system. Another feature of economic consideration is the use of a compound air washer, the first using city water and the second refrigerated water. This type of washing system was installed in order to take advantage of the low maximum temperature of the city water in the summer months (52° F.), thus requiring a rather small refrigerating system. Other features of this system are provisions for exhausting the air in the projection room and the rest rooms, the exhausted air being delivered outdoors. The capacity of the exhaust fans is less than the air supplied for

ventilating purposes, thus keeping the theatre under a slight pressure and preventing the infiltration of dust. The air conditioning plant is designed to maintain in the theatre proper a dry bulb temperature of 80° F. with a relative humidity of 44 per cent when the outside dry bulb temperature does not exceed 95° F. and a wet bulb temperature of 75° F. These conditions are maintained at a capacity of 2,200 occupants.—R. H. Beck, *Heating & Vent.*, XXX, 1:31-33 (Jan.), 1933. (From *Pub. H. Eng. Abstr.*, XIII, AC, 3, 3-11-33.)

**Ammonia Chlorine Treatment Used on East Providence, R. I., Water Supply**—The water, from Ten Mile River, having a drainage area of 54 square miles, containing some swampy areas, has an inferior bacterial quality and a wide variation in color. Chloramine treatment was started in March, 1931. This permitted the carrying of a much higher residual chlorine, reduced aftergrowths in the clear well resulting in very soft instead of hard growths on the pipes in the clear well. Also the filters remain much sweeter and cleaner, although showing no increase in length of run nor reduction in wash water.

The fact that the ammonia chlorine treatment is slower to act was not important even though the nearest consumer is within 400 ft. of the filter plant; samples of water taken twenty minutes after the addition of chlorine, the time estimated as required to reach the nearest consumer, showed no difference whether ammonia was used or not, when tested bacteriologically. Other tests showed that the ortho-tolidine test could be relied upon, but must be interpreted differently and more cautiously. The ortho-toluidine should be added and the reading made within about 20 minutes of the collection of the sample, but in an extreme case in

December the sample did not develop its full color until 45 minutes.—James V. Turner, *W. W. Eng.*, LXXXVI, 5:208-209 (Mar. 8), 1933. (From *Pub. H. Eng. Abstr.*, XIII, W, 49, 4-29-33.)

**Institutional Sewage and Sewage Flow Characteristics**—The results of studies on characteristics of institutional sewage flows and raw sewage composition are given with reference to the effect of these factors on plant design and operation. Average daily flows varied from 99 to 266 g.p.c. and showed some correlation with type of institution. The lowest ratio of maximum to average rate of flow was 1.5. Contrary to the general impression, institutional sewages were in all cases from two to three times stronger than strictly domestic sewages. The average 5-day B.O.D. on the basis of 100 gal. per capita flow was 472 p.p.m. Per capita 20-day oxygen demand varied from 208 to 286 grams per day. Both settleable and non-settleable solids were generally higher than domestic sewage. In some cases the grease content of raw sewage was very high. Sludges were quite similar to domestic sludge.

High flow rates and stronger sewages vary with different institutions and their topographical situations. Before designing an institution sewage treatment plant a careful study of rate of flow should be made and the sewage should be analyzed.—G. M. Ridenour and I. O. Lacy, *Sewage Works J.*, IV, 6:1046-53 (Nov.), 1932. (From *Pub. H. Eng. Abstr.*, XIII, S, 31, 5-6-33.)

**The Electrical Precipitation of Sewage**—A description of the electrical process of sewage treatment first tried out on a plant scale in 1888-1889 by Webster at the South Metropolitan outfall at Crossness. This article is principally about the recent work done with this process by the Niersverband,

one of the youngest German river authorities. The process depends upon the passage of the sewage between metal electrodes, the metal going into solution in the form of ions at anode, and then being rapidly converted into the soluble hydroxide resulting finally in the flocculation of the polluting matter in the sewage, which is then settled out. The permanganate absorption of the sewage has been reduced 45 to 50 per cent and the biochemical oxygen demand 60 per cent by this treatment. Compressed air is used to obtain mixture of the tank contents. It is stated that the energy obtainable from the gas produced in digestion of the sludge is sufficient to meet the electrical and air requirements. Iron is said to be the best electrode material, and that it requires about 50 gm. of iron per c.m. of sewage treated. An experimental plant working on the electrical system was constructed at the Rheydt sewage works and the results obtained there confirmed laboratory results.—*Surveyor*, LXXXIII, 2139:61 (Jan 20), 1933. (From *Pub. H. Eng. Abstr.*, XIII, S, 31, 5-6-33.)

**An Unusual Sewage Treatment Plant**—Sewage from London, Ontario, is disposed of in four separate treatment plants. This article describes the new West End plant designed to treat the maximum flow of 6,000,000 gallons per day. This plant consists of the following units: a large grease trap; grit chamber, fitted with one-inch diameter perforated pipes for admission of either air, or water at intervals to wash grit free of entrained organic matter; a Hankin paddlewheel type, screen with  $\frac{1}{2}$  inch clear openings revolved by the sewage flow; a Hankin fine screen; 24 aeration tanks, which provide  $\frac{1}{8}$  hour's detention. Two compressors of 500 cubic feet and one compressor of 1,500 cubic feet per minute of free air, compressed to 10 lbs. pressure, are used to force air through three types of diffusers,

namely—filtros plates, activated sludge, ltd. plates, and  $\frac{1}{4}$  inch diameter perforated pipes. Air piping is arranged to permit flexibility of operation. There are 2 50-ft. square tanks fitted with Hankin-Fidder scrapers of the twin spiral type. The detention period is one hour and 12 minutes.

The unusual feature of this plant is the discharge of excess activated sludge into the raw sewage whereby the activated sludge adheres to the sewage solids and is removed by the fine screens. The solids so removed are incinerated in a small incinerator. Auxiliary fuel is only required to start the incinerator, which has a capacity of 10 tons of wet screenings per day. Before the screenings are incinerated they are pressed in a home made equipment. The moisture content of the pressed screenings and activated sludge is 87 per cent. The total cost of the plant is estimated to be \$190,000.—W. M. Veitch, *Am. City*, XLVIII, 2:54-56 (Feb.), 1933. (From *Pub. H. Eng. Abstr.*, XIII, S, 24, 4-1-33.)

**The Effect of Pasteurization Upon *Brucella Melitensis* Var. Suis**—Pasteurizing tests using a standard pasteurizing outfit were undertaken to determine whether the porcine strain of the *Brucella* organism was destroyed during the process. Checks on the efficiency of pasteurization were made with milk inoculated with the bovine strain of the organism.

It was found that a temperature of 62 to 63° C. (143.6 to 145.4° F.) for 3 minutes was sufficient to destroy both types of the organism. This shows that the usual pasteurizing procedure when correctly operated provides an ample factor of safety. However, with the lid of the pasteurizer open a much longer exposure was necessary, and the results were irregular and uncertain. The viable organisms were recovered from the foam of such milk even after

30 min. When an ordinary faucet outlet was used on the pasteurizer live organisms were isolated from the outlet after 30 min. pasteurization, while when the outlet was closed by a stopper on the inside no living organisms remained

after 3 min. exposure.—C. Murray, S. H. McNutt, and P. Purwin, *J. Dairy Sci.*, XV, 1:6-13 (Jan.), 1932. *Experiment Station Record*, U. S. Department of Agriculture, LXVII, 6:734 (Dec.), 1932.

## INDUSTRIAL HYGIENE

**Chemical Haematuria from Handling 5-Chloro-Ortho-Toluidine—** Nine cases of haematuria in connection with the purification of 5-Chloro-Ortho-Toluidine and also its hydrochloride derivatives are discussed. These cases occurred in an epidemic extending over a period of four months. The toxic substance and its mode of entry is not definitely known. In the haematuria cases the bladder was chiefly affected, although the kidney was involved to a slight extent. Cyanosis was present, with strangury and frequent micturition, with exfoliation of the bladder epithelium.

The processes followed in the purification of these aniline products are also described.—Arch. N. Currie, *J. Indust. Hyg.*, 15:205-213 (July), 1933.

L. G.

**An Outbreak of Dermatitis in Cotton Mills Due to Varnish—** Cases of dermatitis occurring in a textile plant were investigated. The dermatitis was confined to parts of the workers' arms that rubbed against heddle frames which were coated with a particular varnish. Nineteen out of 32 workers exposed to this varnish contracted dermatitis. By means of patch tests the cause was finally traced to two ingredients of the varnish, cumaron resin and ceresin. Varying individual susceptibilities were demonstrated.

The addition of normal saline solution to the materials used in the patch

tests to simulate action of perspiration added to the irritating action of these substances on susceptibles. — Louis Schwartz and Charles L. Pool, *J. Indust. Hyg.*, 15:214-225 (July), 1933.

L. G.

**A Case of Carbon Monoxide Poisoning From an Oil Stove—** The case history and discussion of a suspected case of carbon monoxide poisoning from a smoking oil stove are presented. The peculiar features of the case were: an unusually long period (3 days) of coma with subsequent recovery; several canary birds and a dog in the room and adjoining room were unaffected; and failure to demonstrate presence of carbon monoxide haemoglobin on spectroscopic examination (later discovered that a faulty technic had been employed).

The importance of a properly conducted blood examination after a case of carbon monoxide poisoning as a means of diagnosis and for medico-legal consideration is stressed. Several tests for the detection of carbon monoxide haemoglobin in blood are suggested.—Lewellys F. Barker, *J. Indust. Hyg.*, 15:238-241 (July), 1933.

L. G.

**The Relation of Carcinogenicity of Mineral Oils to Certain Physical and Chemical Characteristics of These Oils—** The various properties of oil in relation to their carcinogenicity were studied. The refractivity of an



oil appeared to be a good indication of its field of origin as well as a probable indication of its carcinogenicity. The iodine value of an oil also seems to afford an index of its toxicity provided it has not been treated. Oil from 11 different fields were studied and out of these the Pennsylvania oil alone failed to follow the general index of carcinogenicity as determined by the above methods.

The permanganate oxidation values give varying results and are therefore not considered to be of any value in estimating the toxicity of oils.—R. Lyth, *J. Indust. Hyg.*, 15:226-237. L. G.

### Sand and Metallic Abrasive Blasting as an Industrial Health Hazard

—This is a study of the dust hazard in air pressure abrasive blasting operations. A preliminary survey and analysis of the equipment found in 44 plants in 8 states was made, followed by a detailed study of 28 shops located in 4 States. The survey showed that sand was used as an abrasive in 64 per cent of the cases, metal (steel grit and shot) in 34 per cent, and a mixture of sand and metal in 2 per cent of the cases. A description of the four types of generally used air pressure abrasive blasting equipment is presented.

The detailed study consisted of a general plant survey, dust sampling with the Greenburg-Smith impinger, determination of particle size and mineralogical composition and ventilation observations. The efficiency of the positive-air pressure helmet with various quantities of air flow was also determined.

The results showed the following:

(1) The particle-size of practically all the dust was less than 5 microns, modal size between 1-1.5 microns, and only 1 per cent was less than 0.5 microns in size. (2) When sand alone was used the quartz content varied from 42-98 per cent; quartz content of air with sand and metal mixtures as abrasive

averaged 44 per cent; and quartz content 3 per cent with metal abrasives.

(3) The dust concentration (in millions of particles per cubic foot of air) was as follows: Sand blasting rooms (exposure under helmet with non-positive air pressure) 241; sand blasting room (exposure under helmets with positive pressure) 4.7; barrels, 29; tables, 25; cabinets, 3; automatics, 24. (4) Dust hazard is present even in well designed and adequately ventilated rooms with properly designed and maintained equipment when abrasive blasting is in progress. This indicates the necessity for special protection of the worker. (5) The provision of a positive supply of 6 cubic feet of dust-free air per minute to the helmet will protect the worker under actual operating conditions in an abrasive blasting room.—J. J. Bloomfield and Leonard Greenburg, *J. Indust. Hyg.*, 15:184-204 (July), 1933. L. G.

**Pulmonary Asbestosis: Its Clinical, Radiological and Pathological Features, and Associated Risk of Tuberculosis Infection**—The clinical, radiological, and pathological feature of asbestosis are excellently presented. Symptoms of asbestosis generally appear after several years of exposure to this dust—usually after 5-15 years. The average length of employment in fatal cases is about one-half that in silicosis. The symptoms of asbestosis are dyspnoea which is usually out of all proportion to the clinical findings, cough, expectoration, anorexia, cyanosis, emaciation, finger clubbing, and asbestos corns. These symptoms are aggravated during the winter season. Limited chest expansion, impaired percussion note, fine, dry crackling râles and pleural friction sounds are some of the common clinical findings.

The radiological studies are characterized by a fine, diffuse pulmonary fibrosis commencing at the base of the

lungs. The author is of the opinion that a radioscopic examination of the chest followed by a satisfactory radiograph affords the most reliable single evidence in establishing a diagnosis of the state and extent of asbestosis cases.

The characteristic golden-yellow asbestosis bodies found in the sputum and fibrosed lungs of the asbestos workers are described. It is interesting to note the persistency of these asbestosis bodies in the sputum; a patient exposed to asbestos dust for one year showed the presence of these bodies in the sputum 14 years later.

Pulmonary asbestosis, once established, is a progressive disease with a bad prognosis. Until recently tuberculosis complication in asbestosis was thought to be rare but the experience of the author casts some suspicion on this belief. The recognition of the existence of a tuberculosis risk in asbestosis is important when considering preventive measures for this occupational disease.—Philip Ellman, *J. Indust. Hyg.*, 15: 165-183 (July), 1933. L. G.

**Filtered Air Relieves Hay Fever—**This is a study on the removal of symptom-producing substances in hay-fever and pollen asthmatics by the filtration of air. The process of filtration differs somewhat from dust removal in that it is necessary to remove all possible allergic material in order to relieve highly sensitized individuals.

The efficiency of the filters as determined by (1) exposing vaselined slides to the air before and after filtration and (2) counting pollen grains on vaselined slides exposed to outdoor and indoor air, was from 96-98 per cent. The authors believe that a high efficiency of removal may be obtained by using large filter areas with low air resistance and low velocity of air flow.

Clinical observations were made on hay fever and pollen asthma patients who were admitted to the filtered air

wards in the evening for a period of 12-16 hours and then sent out during the day. The study showed that symptoms of hay fever would disappear in 80 per cent of the cases after an exposure of 3 hours or less to filtered air. The disappearance of symptoms was not indicative of cure since there were recurrences of symptoms on exposure to pollen-laden air. The filtered-air treatment, however, is of value since it increases the personal efficiency of the patients in giving them an increased amount of restful sleep. Pollen asthma patients respond more slowly to treatment and no appreciable relief could be obtained unless the patients were exposed to the filtered air continuously.—William W. Welker, B. Z. Rappaport, and Tell Nelson, *Heating, Piping & Air Conditioning*, 5:348-350 (July), 1933.

L. G.

**Industrial Diseases of the Skin—**The chief industrial diseases of the skin are: Anthrax, the most dramatic and perhaps the least common; cancer; and trade dermatitis. Not less than 15,000 cases of dermatitis are certified by factory surgeons every year. Anthrax, chromium compounds, dermatitis in the food industry (bakers, confectioners, and jam makers) are discussed briefly.

Dr. N. Howard Mummery, in discussion, stated that the dermatoses seen in industry, with a few exceptions, were not peculiar to the occupations involved, nor were they more common among industrial employees than among the rest of the community. True industrial dermatitis was uncommon and many of the substances handled were the same as used at home. The warm months, new workers, the state of the skin, were the important factors. "A girl might work for years at a job without any skin trouble, and then become highly sensitive to the irritant; after some months she might again become immune to it."—H.

Haldin-Davis (excerpts from address), *Lancet*, 5729:1288-1289 (June 17), 1933.  
E. R. H.

**Effects of Dust Upon the Respiratory System**—This is the proceedings of a special conference held in Chicago, Nov. 16-17, 1932, under the auspices of the Industrial Commission of Wisconsin, whose Chairman, Fred M. Wilcox, opened the conference. The first address was by Dr. Leroy U. Gardner, Director of Saranac Laboratory for the Study of Tuberculosis, who discussed, for the lungs, the anatomy, the treatment of inhaled foreign bodies, pathology, tuberculosis of various types, and pneumonia. This address with intercurrent discussions by those present covers approximately the first 50 pages of the proceedings.

The second address was by Dr. W. Irving Clark, Medical Director of the Norton Company, Worcester, Mass., and concerns the composition of abrasive wheels, with the showing of chest X-ray films after various years of exposure (pp. 50-70, including discussions).

Dr. Gardner then resumed his address, in which he summarized and amplified his previous remarks, accompanied with a series of 39 slides.

The third address was by Donald E. Cummings, Assistant Director of the Saranac Laboratory, who took up the chemical and physical properties of certain dusts, followed by a discussion of the silicosis hazard in the lead and zinc mines of Picher, Okla. Discussions of Mr. Cummings' and Dr. Gardner's addresses continue to page 124. Next, Dr. H. S. Willis, Pathologist of the Maybury Sanatorium, Detroit, discussed the pathogenesis of silicosis and its relation to tuberculosis, with results of animal exposures, exposure to vegetable and mold dusts, and roentgenological evidences followed by a brief general discussion).

J. J. Bloomfield, Sanitary Engineer, U. S. Public Health Service, followed with an address on the nature of dusts, and especially of silicious dusts, the size of dust particles, dust concentration, and dust suppression—with bibliography (pp. 136-166).

The concluding address was by Dr. Albert E. Russell, Surgeon, U. S. Public Health Service and U. S. Bureau of Mines, who reported upon the study of the dusty trades, beginning with the cement industry in 1924, and accompanied his discussion with X-ray slides from different industries showing various reactions to dust (address with discussion, pp. 167-207).

The Report concludes with brief biographic sketches of the six principal speakers and a list of the 67 persons in attendance.—Wisconsin Indust. Comm., Madison, 215 pp. (Feb.), 1933.

E. R. H.

**Arsenic Poisoning in a Manganese Factory**—Dr. Salmon and Dr. Planque (*Ann. d'hyg. pub. indust. et sociale*, April, 1933) have lately described an outbreak of arsenic poisoning in a factory which, in December, 1929, began to crush and dry salts of manganese. In October, 1932, some of the employees were found to be suffering from such symptoms as pain in various parts of the body, difficulty in walking (particularly downstairs), stuttered speech, and mask face. The extensors of the legs were slightly atrophied and a steppage gait present. In none of four cases were there cutaneous manifestations, a positive Wassermann, cyanosis of the extremities, or hyperkeratosis of the palms of the hands or soles of the feet. In diagnosis, lethargic encephalitis and disseminated sclerosis had to be considered.

Inspection of the factory showed the workers looked like "blackamoors." so thick was the manganese dust on them. They were all indoor workers. How-

ever, one of the most exposed to the dust had shown no signs of poisoning. Also those who worked outdoors were free of symptoms. "An analysis of the powder handled in the factory showed it to contain over 81 per cent of the oxides of manganese, and over 9 per cent of silica. It also contained

0.013 per cent of arsenic." (Surely these cases would be called *manganese poisoning* in this country, where several similar reports had been made since the first one by Casamajor in 1913.)—(*Abstractor's comment.*) *Lancet* (Notes, Etc.). 5729:1325 (June 17), 1933.

E. R. H.

## FOOD AND NUTRITION

**The Character of the Dermatitis-Producing Factor in Dietary Egg White as Shown by Certain Chemical Treatments**—This represents an extension of work previously reported (*Abstract, A.J.P.H.*, Vol. 21, May and Sept., 1931), in an effort to determine the nature of the toxicity of Chinese dried egg whites. Rations employing respectively 66, 40, 30 and 20 per cent, on a dry basis, of egg white, were given to rats. The pellagra-like symptoms in these young rats were first produced by a basal egg white ration with 66 per cent of egg white. Substitutions or additions to the diet were then made to determine the effect of various methods of treatment of the egg white. Results were measured by the degree of severity of the pellagra-like syndrome. Definite toxic symptoms followed the ingestion of Chinese whites, raw and dried, fresh whites, raw and dried, Chinese whites precipitated by alcohol and dried. In the latter case, neither treatment with alcohol for 35 days nor dialysis of the alcohol precipitate for 50 hours before drying lessened the toxic symptoms. No beneficial effect was secured from Chinese dried whites either treated with nitrous oxide or when treated with formaldehyde. When 1.6 c.c. normal hydrochloric acid per gram was added to the Chinese whites incubated at 37° for three days and dried, the animals showed a prompt response with a disappearance of the pellagra-like condi-

tion. The same results were secured with this percentage after neutralizing and drying. The addition of 1 per cent normal hydrochloric acid per gram and incubation did not relieve the toxic condition of the egg white nor did the addition of 1.6 c.c. normal acetic acid with similar incubation. Satisfactory curative results were secured with fresh egg whites heated to 80° for either 5 or 20 minutes. The toxic effects were apparently not due to denaturation as evidenced by the toxicity of egg white after it is denatured with alcohol. There is an indication that the detoxification involves hydrolysis. The same satisfactory result was secured with 1.6 c.c. normal hydrochloric acid per gram, either with or without peptic digestion. —Helen T. Parsons and Eunice Kelly. *J. Biol. Chem.* 100:645 (May), 1933.

**Effect of Sunshine Through Window Glass and Fresh Air on Resistance to Infection**—The effective narrow band of ultra-violet solar rays which prevent or cure rickets does not penetrate common window glass. Little definite information exists as to the effect of either the visible or infra-red rays on the growth of the animal organism. Several investigators have shown the effect of clouds, dust and smoke on the ultra-violet rays, particularly during the winter months. The observation is made that the same influence affects the intensities of the

visible and infra-red rays, and the therapeutic value of sunshine with fresh air in the treatment of tuberculosis is cited.

In these experiments, young rats on a normal diet without any concentration of vitamin D, such as cod liver oil, were kept away from sunshine. Once a week, litters of these rats, from 25 to 27 days old, were divided into 5 groups and 3 of the groups placed on a modified rachitogenic diet. For 4 weeks one group was given direct sun bath under window glass from 11:00 A.M. to 1:00 P.M. The total sunshine received in the experiment was from 25 to 35 hours. Another group of rats was exposed to fresh air only, but all other conditions were the same. A third group was kept inside. At the end of 4 weeks, no great differences in weight were shown in the three lots. At this time two representative rats from each group were used for the determination of inorganic phosphorus in the blood and the percentage of bone ash in the long bones. Very little difference is shown between the three groups. Rats were then infected with a culture of "rat typhoid" a strain of *Salmonella enteritidis*, isolated from the infected middle ear of a white rat. Four weeks after infection, experiments were terminated with the result that the rats given fresh air and sunshine through common window glass survived in greater numbers than the group kept inside. The rats kept in fresh air survived better than those kept inside except in one instance. Conclusion, therefore, is drawn that both fresh air and sunshine through glass increase resistance. In the case of rats which received a modified rachitogenic diet fortified with additional vitamin D, the rats exposed to direct sunshine through glass withstood infection better than the inside controls. Fifty-seven per cent of the rachitic rats under common window glass survived, against 32 per cent kept

inside. With the vitamin D, 75 per cent of those exposed under glass survived, against 61 per cent kept inside. The vitamin D furthermore increased the ability of the rats to withstand infection.

The authors point to the fact that on a rachitogenic diet the increased resistance was not responsible for the improvement of the rickets, since the sunshine which penetrates common window glass is without antirachitic effect. They conclude with the following:

The vital radiations from the sun should not be limited to the narrow band in the short ultra-violet region, which is antirachitic. The foregoing results show definitely that rays longer than those that are necessary to prevent or cure rickets have a marked effect on the animal organism, as evidenced by a decided increase in resistance to infection.—

John R. Ross, Elizabeth Chant Robertson, and Frederick F. Tisdall, *Am. J. Dis. Child.* 45:81 (Jan.), 1933.

**Food Poisoning Due to Staphylococci**—An outbreak of gastroenteritis occurred among women students of a southern educational institution involving 150 marked cases, 75 of which were severe. A number of other victims suffered less severely. Conclusive epidemiologic evidence incriminated chocolate eclairs as the vehicle carrying the causative agent. Of those who ate eclairs, 60 or 70 per cent were affected. The onset of symptoms was within two or three hours following ingestion. The custard filler for the eclairs was prepared at the bakery in the morning and the eclairs were delivered at 11:00 A.M. There were several batches of eclairs which may help to explain why more of those who ate eclairs were not made ill. The symptoms were marked by nausea, salivation, abdominal pain, vomiting, extreme prostration, profuse diarrheal attacks and chills. Bacteriological examinations of the custard from the

eclairs and of the pastry disclosed the presence of numerous yellow staphylococci and no organisms resembling the *Salmonella* group. Ten cubic centimeter quantities of bacteria-free filtrates prepared from cultures of the cocci were fed to each of eight human volunteers in 200 c.c. of pasteurized milk. As controls, four students were given similar amounts of sterile broth of the same batch used for growing the organisms. Of those receiving the filtrate all were ill except one: she was slightly nauseated and felt weak. None of the controls was affected. All symptoms, which appeared in from 1 $\frac{3}{4}$  hours to 3 hours, were similar to those exhibited by the women students who were sick following the consumption of eclairs. Examination of all ingredients used in preparing the eclairs and careful investigation of conditions at the bakery failed to disclose the source of the staphylococci. Experiment showed that the cocci isolated from the eclairs would be destroyed at the temperature and during the time of cooking the custard filling. It is stated that pastries, custard fillers and the like should be well protected against contamination in preparation and storage. Custard fillers should be refrigerated. After baking, cakes and pastries should be covered or placed in specially constructed cases and not left in the open. These precautions could well apply to the storage and handling, following delivery, especially in institutions where a large kitchen force is employed.—Ralph McBurney, *J.A.M.A.* 100:1999 (June 24), 1933.

**Studies on the Physiological Action of Glycerol on the Animal Organism**—The authors have summarized their work as follows: In studies of replacement of carbohydrate by glycerol in the diet of rats (40 weeks) to a point where glycerol consti-

tuted 41 per cent by weight of the total food intake, and in the diet of dogs (50 weeks) until it amounted to 35 per cent of the intake, normal growth occurred. Reproduction in rats was unaffected. Addition of glycerol to a rat diet qualitatively adequate but quantitatively just sufficient for maintenance of body weight caused a resumption of normal growth. Addition of 110 grams of glycerol per day (50 days) to an adequate diet in man produced a slight tendency toward increased body weight.

Ingestion by growing dogs of 9 grams of glycerol per kilogram per day for nearly a year did not change the red blood cell count. Ingestion by man of 110 grams of glycerol per day for 50 days did not affect the red or white cell counts or the hemoglobin content of the blood. In neither man nor dogs was albuminuria or hemogloburia produced from glycerol taken orally, although both of these phenomena were produced in dogs upon parenteral administration. Glycerol per os in relatively large quantities exerts a diuretic action in dogs and rats, but in the quantities fed to man it lacked this effect. The body temperature of man and dogs was unaffected by glycerol ingestion. No adverse subjective effects in man and no changes in the general appearance and behavior of rats and dogs throughout the observation periods, resulted from glycerol ingestion in the quantities used. In man the basal metabolism and uric acid excretion were not significantly affected. Activity of the large intestine of man as regards daily number and consistency of stools, was unaffected by the quantities of glycerol fed. No gross or microscopic pathology was detected in rats and dogs reared (for nearly a year) on diets of high glycerol content.—Victor Johnson, A. J. Carlson, and Adelaide Johnson, *Am. J. Physiol.* 103: 517 (Mar. 1), 1933.

# CHILD HYGIENE

## THE TUBERCULIN SKIN TEST FROM THE SCHOOL PHYSICIAN'S STANDPOINT

L. W. CHILDS, M.D.

*Supervisor, Health Service, Bureau of Physical Welfare,  
Board of Education, Cleveland, Ohio*

**D**URING 1931, 769 Clevelanders succumbed to pulmonary tuberculosis.

86 of these cases were reported three months before death,  
140 only one month before death,  
131 less than one month, and,  
79 at or after death.

A total of 436 cases were reported only three months or less before death. The amount of damage resulting from the dissemination of the tubercle bacilli cannot be calculated.

Too long has the medical fraternity placed its chief reliance on the use of the stethoscope. Too long have we been concerned only with the familiar type of the disease. The hidden and dormant type with only an involvement of the lymph nodes with possible minor changes in the adjacent lung tissue, has until of late been unrecognized. For a number of years we have known of this childhood type of tuberculosis and have sought to recognize it by means of a chest examination of each elementary school child. The stethoscope, aside from cardiac ailments, has revealed little of value. The time and the effort of a trained staff of physicians in the discovery of pulmonary lesions did not produce results commensurate with the cost of the service.

The pupils of our open air classes were mainly selected from a group of underweight children, since it had always been assumed that the poor

underweight was in the pre-tuberculous stage and must be provided with a hood and coat and placed in a room that had escaped the notice of the mechanical ventilation expert. This arrangement provided rest periods, fresh air and food for these underweights who were often tuberculosis contacts. Upon the whole it was questionable whether our open air classes (22 in number) produced results which justified the extra outlay of money necessitated. In order to determine whether the 50 per cent extra expense per pupil was really justified in terms of health, a competent member of our Health Service Staff, Dr. Joyce I. Hartman, made a survey of our open air classes during the school year 1930-1931 and submitted the following report:

The open air school rooms were instituted in Cleveland 20 years ago primarily for tuberculous children whose condition was not regarded as serious enough to warrant hospitalization or "preventorium" care. The beneficial effects of special rooms, extra rest, and extra food have always been recognized in the care of such individuals. Since the cost of maintaining these special rooms is high (at least 50 per cent additional per pupil) it has been important to select the proper children. The selection of these children has been a problem. Until recently they have been selected upon the following criteria: (1) Malnutrition, (2) symptoms such as cough, (3) history of contact, (4) opinions of school physicians, nurses, and teachers. It has been recognized that such methods were grossly inaccurate. During the school year of 1930-1931 it was decided to make a survey

of the pupils in the open air rooms to find out what percentage, selected upon the above basis, have or have had a tuberculous infection as is shown by the most reliable method available, the intracutaneous tuberculin test. These tests were made with dilutions of old tuberculin (human) and phenolized saline controls. These tests were done upon the forearm, and in 95 per cent, 1 in 1,000 solution of tuberculin was used. Where there was any evidence of possible increased sensitivity such as scars on the cornea due to old phlyctenular ulcers, history or evidence of asthma and other allergic diseases, a dose of 1 in 10,000 solution was used. The tests were read in 48 hours. Only one test was made on each individual and it is admitted that probably in a few cases the reaction appeared negative, which with the repetition of a greater dosage might have been positive. No severe generalized reactions occurred.

One hundred and seventy-eight boys and 310 girls, a total of 488 pupils in 22 open air rooms in seven different schools were tested. An average of only 35 per cent was found positive. There was a 2 per cent sex difference, the boys being higher. The age range of these children was from 7 to 12 years.

In one school where 100 pupils were tested, only 16 per cent were found positive. This school is located in an Italian section. The highest percentage was found in a Negro school where 71 pupils were tested, 52 per cent being found positive.

Eighty-five per cent of the open air pupils were underweight (8 per cent or more according to the height-weight charts). The percentage of malnutrition was the same in the schools where the percentage of positive tuberculin tests was low—16 to 20 per cent; and where it was high, 52 per cent. Only 35 per cent of the underweight children in the open air rooms had positive tuberculin tests.

These facts verify what we thought was true, that pupils had been placed in open air rooms chiefly on the basis of malnutrition, and corroborates our opinion, and that of others, that tuberculosis is not a common cause of malnutrition in the pre-teen age.

Sixteen per cent of the children tested came from families where there was some record of tuberculosis in another member of the family. Seventy-five per cent of these had positive tuberculin tests.

At present, tests are being made in the regular rooms to ascertain the proper location of open air rooms and to replace the 65 per cent of negative reactors now in open air rooms. Plans are being made to obtain roentgenograms of the chests of all positive reactors as this offers the best if not the only

means of ascertaining the activity and extent of the disease.

### CONCLUSION

(1) The work has demonstrated the practicability of the intracutaneous tuberculin test in public school health work.

(2) The intracutaneous tuberculin tests as done in the open air schools of Cleveland show, (a) that tuberculosis is not concerned in large percentage (65 per cent) of malnourished children of the pre-teen age. (b) That a large percentage (75 per cent) of children from tuberculous families reported by the City Health Department have or have had a tuberculous infection.

(3) It is our opinion that the intracutaneous tuberculin tests supplemented with roentgenographic studies of the positive reactors is probably the only satisfactory method for selecting pupils for open air class rooms.

I am not taking the attitude that open air rooms should be available only to the delicate child showing a positive cutaneous test. There are other pupils among which are certain cardiacs in need of rest periods; asthmatics in need of oxygen; and grave cases of malnutrition in need of food, rest, and a knowledge of simple health rules. In general, however, open air rooms should be used for delicate pupils with the childhood type of tuberculosis.

The early detection of this infection rests with the needle and not with the stethoscope. Dispensaries are provided in a majority of school buildings, but they are not the quiet places that one could wish for in the careful auscultation of the lungs of school children. Such an examination is unnecessary in the negative reactors, or about 80 per cent of elementary school children, and 40 per cent of the pupils of high school age. Thus the school physician is relieved of a vast amount of chest auscultation carried out under difficult conditions and as far as the detection of a tuberculous infection is concerned, with meager results.

But some one enquires; is not this method of ferreting out open cases of



pulmonary tuberculosis among the parents through the detection of recent infection in their children exceedingly costly? After all, are not the results so meager that it is really better to conserve the tax-payer's dollar and, if need be, to spend the same for wholesome food which in turn will tend to prevent tuberculosis?

If it is good policy for the public to spend public funds liberally in the detection and the subsequent trial and incarceration of a criminal, why will not society profit to an equal degree by the detection and the subsequent examination and the safeguarding of the public from an open case of pulmonary tuberculosis. Both are a menace to the public. Both may require confinement. The one in a prison, the other in a sanatorium. Both bring tragedy to the home.

Preventive treatment would have saved either. The criminal could have been saved by the psychiatrist had he been discovered at an early date and a proper training instituted. The positive reactor to the tuberculin test could have been taught to know his own limitations. Health education in the school curriculum would have taught him health habits which would by their exercise, have prevented the extreme tragedy.

If then, it is good public policy to safeguard a child with criminal tendencies by educational procedures, it is likewise good public policy to safeguard a child with tuberculous tendency, to teach him to know his limitations and the simple laws of health the following of which will enable him to avert the supreme tragedy.

Upon the whole, if it is a good procedure to employ a Sherlock Holmes to ferret out a criminal who is a menace

to society, it is equally justifiable to use Sherlock Holmes methods in our medical school work in order that the open case may be discovered and educated or isolated and society protected.

As a concrete example of this ferretting procedure, I offer the following case:

William and Lucille F——— were found to be positive reactors by our physician assigned to the Kennard School. Both were examined by him and were sent to a health station maintained by the Board of Health where they were X-rayed. William's X-ray showed healing primary tubercles. Lucille, who was running a temperature afternoons showed the shadow of her right hilum to be denser than normal.

The family follow-up record of the Department of Health nurse indicated that both parents were well nourished healthy people. However, there was a third child, Ruth, age 20 years, who was working as a maid in an East Cleveland home who was reported well by her parents. She was found to be a moderate tuberculosis case with positive sputum and sent to a sanatorium at once for treatment. Ruth was badly exposed to tuberculosis by a maid in this East Cleveland home who occupied the same bed until she was sent to the City Hospital, where she died soon after.

It may be noticed in this case, which illustrates many others, that there was perfect coöperation between the Department of Health Service in the schools and the City Health Department and that there was no duplication of effort.

Add to this combination, the school's Division of Health Education which seeks to instruct the pupil in simple health laws and is interested in his nutrition, and also add the Anti-tuberculosis League with its inspiration and oftentimes funds, we then will have a combination that is quite effective in the handling of the childhood type of tuberculosis problem.

## PUBLIC HEALTH NURSING\*

Nursing Education in the Future—More and better theory. Less and better practice. These are the two probable changes that the near future will bring in nursing education, according to the Committee on the Grading of Nursing Schools.

There are few forms of education for professional workers in which seven times as much practice as theory is needed. Yet 885 hours of theory is the amount recommended for nursing students by the National League of Nursing Education. The Grading Committee believes this recommended amount of theory should constitute the absolute minimum offered by any school.

Only 22 per cent of the accredited schools studied by the Grading Committee comply with the present "very low requirements" for hours of theory. The typical school gives 124 less theory and 843 hours more practice than the League standards contemplate, the Committee finds.—*Western Hosp. Rev.* XXI, 5:13 (July), 1933.

Canadian Appointment of Nurse as Health Consultant—The Ontario Department of Health, through the recommendation of the Minister of Health, has made Miss Elizabeth Smellie Chief Superintendent of the Victorian Order of Nurses of Canada, Honorary Consultant in Public Health Nursing. This is an official government recognition of the value of nurses as health counsellors.—*A Nurse as Health Consultant. Canad. Nurse*, XXIX, 5: 234 (May), 1933.

This is right in line with the action of the New York State Department of Health, which recently appointed Katharine Tucker, R.N., Director of the National Organization for Public Health Nursing, as consultant in public health nursing.—*Why Not Make Use of the N.O.P.H.N.? A.J.P.H.* XXIII, 2:170 (Feb.), 1933.

A Visiting Nurse Association Serves Research—A principle found in the urine of pregnant women was being studied by the Biological Laboratories of E. R. Squibb & Sons, New Brunswick, N. J., in 1930. It was difficult to get an ample supply of such urine and the New Brunswick Visiting Nurse Association was consulted about ways and means. The director and her staff nurses picked out 6 prenatal patients who, they thought, would be glad to earn some money in this way and a routine was arranged with the Squibb Laboratories for 3 months.

When the trial period was over the Laboratories were sure their product was of value to the medical profession but they needed an increased supply of urine, collected between the 3rd and 8th months of pregnancy. More prenatals were put on the Squibb list, and each patient was turning in three 1-gallon jugs of urine a week to the Visiting Nurse Association Office where it was collected by Squibb. In the 2½ years this plan has been in operation, \$8,000 has been distributed to 199 expectant mothers.

The Medical Advisory Committee of the V.N.A. was consulted from the beginning of the experiment. Each staff nurse "selected cases in her district, explained the purpose of the plan to the

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

patient, taught the patient the collection routine and checked up failures. The office staff supervised the exchange of bottles at the office and took care of the cash payment received from E. R. Squibb & Sons."

The financial need of the family was considered in choosing the patient. The nurses had to be sure the money received for the urine was well spent and had to plan with the patient, the physician and the relief agencies to this end.

Whenever the urine was not acceptable, whether for a pathological or a chemical reason, the visiting nurses were notified and they in turn notified the private physician, the clinic and the patient. The patients tried to follow accurately the nurses' instructions for payment ceased if the urine did not measure up to acceptable standards. In several specimens the chemical constituents were not right, apparently due to the faulty diet of the prospective mother. On this problem the staff nurses of the V.N.A. and the Home Economics Department of New Jersey College for Women in New Brunswick worked together to the benefit of all.

Private physicians, the city physician, the hospital, the emergency relief administration, the charity organization society and the Overseer of the Poor all met together to discuss this plan as it related to families on the relief rolls of the city.

Soon after the plan was under way Squibb requested the V.N.A. Medical Advisory Committee for advice as to how they could be assured that the women from whom collections of urine were made were free from syphilis. This committee and the physicians caring for maternity cases in the community consented to have a smear and a Wassermann taken on each patient in the

Squibb Laboratory. A confidential report of the findings was sent to each patient's physician.

"All in all this unusual plan has been of great service to the patients, the research laboratory, the social agencies, the private doctors, the hospitals and the community in general."—Emma Rae McLeod, R.N. and Margaret B. Wright. *A Community Serves Research, Pub. Health Nurs.*, XXV, 8: 436-438 (Aug.), 1933.

**For Superintendents and Supervisors Only**—The nursing personnel of a well regulated hospital or public health nursing association, figuratively speaking, forms a pyramid. The nursing staff forms the base, the supervisors are above them, and at the top comes the superintendent of nurses. It is by virtue of superior training or superior experience or both that the supervisor should have authority over the staff nurse; mere authority unsupported by superior training or experience breeds nothing but contempt among the nurses who must submit to it.

Here are some of the qualities a nurse has a right to expect of her supervisors always and everywhere: fair play, professional honesty, an equable disposition and firmness of decision. Added to these qualities should be superior training and superior experience.

It is good policy and not below her dignity, for the supervisor to invite constructive criticism of her work from the nurse's point of view. Staff nurses are much more apt to act like human beings if they know they have a human being over them who dares to admit now and then that she is infallible.—*The Nurse Looks at Her Supervisor*, by Harlan C. Koch, Ph.D. *Trained Nurse & Hosp. Rev.* 90, 7:39-41 (July), 1933.

## EDUCATION AND PUBLICITY\*

**Prenatal Letters Increasing in Demand**—The use of the prenatal letter service offered by the Division of Maternity, Infancy & Child Hygiene was greater by more than 50 per cent in 1932 than in the year before, reports the New York State Department of Health, in *Health News* (Albany, N. Y.), May 22, 1933.

Distribution through nurses and clinics accounted for 83 per cent of the names on the mailing list.

*The Parents' Book*, carrying a coupon for the prenatal letter service, was sent automatically to each bride when her marriage was recorded. Almost every mail brought returned coupons, and those who received the letters frequently sent in the name of a friend.

The increased use of the service was due in large part to the continued support of nurses throughout the state working individually or in organizations such as visiting nursing associations, the American Red Cross, and insurance companies. During the past year, one large insurance company approved the prenatal letters for pregnant women insured by them and another continued to refer many expectant mothers under its care. Boards of health of several cities also made liberal use of the service.

**"Better Health Verse at Hand"**  
—Says *Ohio Health News*, Columbus, May 15, 1933:

Better health verse for children is coming to the front in some of the recent books. Only a few years ago virtually all material of this kind was inane, to use no harsher term; much of it was silly and a large proportion was badly written. Excerpts from three of the latest books, *Little Miss April*, by Anne Robinson; *Skiping Along Alone*, by Winifred Welles, and *The Bucking Burro*, by Nancy Ricket Ranson, have come lately to editorial attention, and all reflect a vast improvement over run-o'-mine stuff of hardly more than yesterday. Any mother who still finds opposi-

tion and resentment when she places the carrots and spinach on her little one's plate is likely to appreciate this bit of verse, taken from "Old Bossy," as found in *The Bucking Burro*:

I asked our cow, Old Bossy,  
Who gives delicious milk,  
"Why is your skin so glossy,  
And soft as finest silk?"

She ate her beets and carrots—  
"Why! don't you know?" she said,  
"Green vegetables and cereals  
And early hours to bed!"

*Little Miss April* is from the Oglethorpe University Press, Miss Welles's book is a Macmillan publication, and *The Bucking Burro* is from the Kaleidograph Press.

**"Healthland" at Farmers' Picnic**—Healthland, an exhibit arranged by the County Department of Health, was one of the chief centers of attraction at the Farmers' Picnic in Cattaraugus County, June 24, 1933.

The clanging of the bell on the "Healthland Special" train attracted a throng of children and their parents. The eager children were weighed and measured and given their tickets by the nurse. After these preliminaries were attended to the jovial conductor assisted the children down the steps and into the spacious, brightly painted coaches. The engineer received his signal and with a toot of the whistle and the clang of the bell they were off for the Land of Health.

Upon their arrival at the Gate of Healthland the children had their tickets punched indicating the various stations at which they should stop while in Healthland. A nurse accompanied the children and emphasized the health rules which were suggested by the exhibits, or "stations," as follows:

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Reutzahn, 120 East 22d St., New York, N. Y.

"Playmeadows," "Drinkwater," "Sunshine Park," "Land of Pearls," "Bath-tubville," "Milk Station," and "Sleep Mountain."

The show was held under the grandstand. A tractor and several trucks were the basis of the "train." Empty oil drums and wall board, with vivid paint completed the picture. The round trip ticket entitled the child to a train ride to the stations or the exhibits, and to a return ride to the starting point.

For a description of the ingenious exhibits and snapshots of the train write to Dr. J. Warren Bell, County Dept. of Health, Olean, N. Y.

**A 2,000 Year Old Idea**—The father's part in child welfare is receiving much attention among health workers in England and Ireland. *Mother and Child*, London (June, 1933), says:

All those who are advocating the study of fathercraft as a factor in the child welfare movement may not be aware that as a matter of history the idea of fathercraft actually preceded that of mothercraft. Dr. Eric Pritchard, speaking at the third annual conference of Fathers' Councils at the Violet Melchett Infant Welfare Centre on March 23, 1933, pointed out that nearly 2,000 years ago Plato claimed that the bringing up and education of children was so important a matter to the State that this duty should be undertaken by its most intelligent members. These Plato considered to be men and fathers. Dr. Pritchard also pointed out that Dr. William Cadogan, a well known London physician in the year 1760, held the view that fathers ought to take a hand, owing to their superior intelligence, in the care of infants. He regarded this, the modern revival of an old belief, to be extremely valuable to the welfare movement.

**"Interpreting Medicine to the Public"**—This is the title of a clear and readable account of the work of the Medical Information Bureau of the New York Academy of Medicine, by Dr. Iago Galdston, its director.

In its credo, the objectives of the Medical Information Bureau are defined as follows:

"(1) to facilitate the dissemination of authentic information on medical and public health matters, (2) to stem and curtail quackery, and (3) to promote a better understanding between the public and organized medicine."

If it were not for the bizarreness of the expression, the Information Bureau might well be called the intelligence service of the medical profession, comparing it in a sense with the intelligence service of the army. That this view of the Medical Information Bureau is not entirely fanciful is attested to by the fact that many medical associations throughout the country have shown a marked interest in the bureau and some have established similar organizations. More than that, in the City of New York, the legal profession has followed suit and has also created an Information Bureau.

*Quart. Bull.*, Milbank Memorial Fund, 40 Wall St., New York. July, 1933. Copy free.

**Wanted at Indianapolis**—Most important to show at "Education and Publicity" headquarters is whatever new and good materials have been produced by our readers and other public health workers.

The headquarters display is made up of (1) portfolios of samples and information on method; (2) some portfolios of assembled subject matter samples; (3) portfolios sent by public health workers; (4) portfolios supplied by a few national health agencies, or concerns doing a certain amount of health work; (5) a few selected devices and materials.

Please write, as suggested elsewhere, about what you have.

Samples of materials which could be included in the first and second groups of portfolios noted above should be sent early to

Indianapolis Display  
Ewart G. Routzahn  
130 East 22d St., New York

Whether or not you have already sent to the editor samples of printed or mimeographed material, please send copies now to the address above. Subjects on which material is

especially desired: public health and health organizations in the depression; presenting health topics to groups at any time and anywhere by any method.

**Write Before You Pack**—Please write before you take or send an exhibit or display, even a chart or portfolio, for the Annual Meeting at Indianapolis, October, 1933. When two or three people turn up without making advance arrangements a lot of trouble results.

All display space at Indianapolis will be limited. Education & Publicity will have a plan for its limited space. *So please write about anything you will have to display.* Write about any class of Exhibits to American Public Health Association, 450-7th Ave., New York.

**"Mass Education"**—The Milbank Memorial Fund (40 Wall St., New York) *Quart. Bull.*, July, 1933, prints Bertrand Brown's thoughtful analysis of the essential steps in "Mass Education." This paper was read before the Health Education Institute of 1932.

The essential steps are indicated in a four-part question:

- (a) What facts and ideas must be secured,
- (b) to transmit through what media, (c) to what audiences, (d) to accomplish what objectives?

Whether he is discussing a, b, c, or d, Mr. Brown continually drives home the need for simplification:

However small their cost, the most expensive mass educational efforts are those which are unheard, unread and unseen. Too often publication is premature, before the material presented has been authenticated and put into a form which will not only engage the reader's attention and interest but be read and understood by him and gain his confidence and support.

Take, for example, the hypothetical case of Mr. Alan Blank, banker and leading citizen of Buckeye Falls. He is used to getting it "on a silver platter"—to having it meet him more than half way. His research faculties have been dulled by a continuous diet of

books, magazines and newspapers—the contents of which must be "full-baked" to have their media survive. He chooses to receive this "predigested" literature and pays for it. He doesn't have enough time to read as much of it as he would like. When he receives gratuitously a body of information phrased in a writer's technical jargon, it is not surprising, therefore, that it fails to interest him. He fingers it, decides not to exercise the disciplinary concentration which a reading would require, lays it aside, forgets it, and thus nullifies in so far as he and his influence are concerned the return on the investment of money and effort which have gone into it, from the initial research to the final mailing.

A chart of "Media of Communication Available for Use in Mass Education" classifies the media according to the amount of selectivity of the audience that each channel allows.

A group of 8 photographs show vividly the modern communication systems which make it possible for the masses to receive simultaneously as a nation, ideas, images and emotions.—M. S. R.

**Current Facts on Health**—"Source Material for the Publicity Desk" is the sub-title of a series of bulletins issued in 1932 by the United Educational Program of the National Social Work Council. A supplementary series for 1933 has just been issued. Of the 10 supplements six deal with health topics under the titles: "Health" (including child health and nutrition), "Public Health Nursing," "Social Hygiene," "Tuberculosis," "Mental Hygiene," and "Hospitals." Other topics in the series are: "Family Welfare," "Child Welfare," "Transients," and "Character Building," all of which have health aspects, although they are not brought out in these bulletins.

Each bulletin contains several pages of brief paragraphs and suggestions of further material. The editors of the series say:

In supplying this source material, we visualize its local use in informative talks, articles,

letters and discussions apart from and probably in advance of money raising campaigns.

It is the aim of the editor to include in each bulletin of this second series only such facts, figures and statements as have become available since the earlier bulletin on the same subject was issued. For this purpose, known sources of reliable information have been canvassed as fully as possible. When you are looking about for a fresh slant, you may in glancing through the bulletin on your topic feel reasonably sure that it tells, or refers to, whatever any established national agencies have compiled or discovered this year that is new or different and of public interest.

*Is There Any News?*—Any evidence of change has news value. The bulletin on Public Health Nursing reports that "Nursing organizations everywhere are able to carry their load only as they shift the emphasis in their programs from teaching people how to keep well to caring for people who are already sick." There is a story in the comparison of this statement with the local situation, together with an interview with the right person on the poor economy of allowing this neglect of the nurses' educational program to continue.

*Is There Any Fresh Material?*—Another evidence of change mentioned in the same bulletin is contained in the report of a study in New York State which revealed that illnesses lasted much longer among a group of families who were victims of the depression than in similar families studied in pre-depression years. Check up this statement with local health authorities. Is the local situation in regard to length of illness similar?

While the facts contained in the bulletin are not spot news, their publication in this form makes an occasion for restating them in news stories in combination with local information. A letter to the editor may be a more appropriate form for brief treatment of some of the material than a news story.

*Do You Find Any Ideas for Feature Articles?*—In some of the bulletins the material as a whole can be rearranged and restated to make a feature article illustrated by local facts, figures and examples. More often a better use of the bulletin would be to draw from its headlines, its examples, or its statistics, ideas to propose to local special writers, together with a promise of more source material from your own files.

*Could Your Editors Use the Bulletins?*—If your relations with the local editors are such that you can from time to time call material to their attention, you may wish to mark up certain issues of the bulletin to send to them. In fact there is probably a greater wealth of material in the bulletins for editorial writers

than for either news or feature articles—material that lends itself to comment and to treatment in brief form.

*Are You Looking for Fillers?*—As you go through the bulletins you may note sentences or paragraphs to mark for possible use in your house organ or campaign handbook. What Dr. Welch said about America's two unique contributions to medicine is a paragraph of this kind.

Single copies, 10 cents. The set of 10, or any 10 copies, 75 cents. Community Chests & Councils, Inc., 1810 Graybar Bldg., New York.

If you have an idea on which you think more material might be had from a national source, or if you can contribute helpful data, write to Mabel B. Ellis, Editor, Behind the Front Lines, 130 East 22nd St., New York.

**Attractive Information About Low Cost Diet**—Some of the obvious publications on depression diets are less useful than others. Some are so deadly dull in appearance. Others are complicated for ready reference. Some are far better for the health or social worker than for the harassed housewife.

Whether one wishes to recommend material published by others, or wishes to re-publish or to re-write for local publication it would be well to compare some of the already published material.

The best of the inexpensive material available nationally is listed in *Some Publications on Low Cost Diet*. Social Work Publicity Council, 130 E. 22d St., New York. 6 cents. Classified with brief descriptions of publications to be secured at low rates for workers or for clients, or to be republished locally. Publications issued in the United States or Canada.

A collection of this material could be displayed at the public library, the health department or the health association.

In addition to any free distribution it is likely that some of the "white collar" housewives might be interested

in certain of the publications sold at 5 cents or 10 cents a copy. The health department or association might arrange for such sale through a coöperative book seller even though he sold them at cost.

Hygeia for August, 1933—"The Facts About Proprietary Foods" (the problems; what the American Medical Society has done; a proposed book on "Accepted Foods"—and the unaccepted); "Forty—Looking Forward" ("the beginning of a man's usefulness"); "Dog Laws" ("for those who love dogs but love their children more"); "In the Shadow of the Needle" (a diabetic patient); "The Cross-Eyed Child" ("early treatment will correct this handicap"); "Vitamin D Milk" (what it is, how prepared, proper way to use it); "Thinking of Studying Medicine" (what to expect); "Egg Free" (substitutes for eggs); "The Effect of Teeth on Facial Expression"; "Exhibits of the A.M.A." (pictures of modeled figures of medical leaders); "Preventive Psychiatry" ("facing the facts of reality squarely and frankly"); "Training for Athletics & Health" (correcting physical defects); "Safeguarding the Take-Off for School"; "Sex Education" (plant and animal reproduction); "Eating Under the Sky" (how the day may be "perfect"); "Progress in Preventive Medicine" (respiratory diseases); "School and Health" (includes "Teaching Health" and "New Health Books and Teachers' Materials.")—American Medical Association, 535 N. Dearborn St., Chicago. 25 cents. Sample copy free.

Suppose We Compare Notes—The unlovely effect of poison ivy on the editor of this department makes poison ivy information of special interest.

Material has been gathered from a group of state health and agriculture

departments and other sources. "The facts about poison ivy," its prevention and first aid medicines vary quite a little. For example: "Some persons are so susceptible that they are affected even by passing near the plant" *versus* "Despite the mass of hearsay evidence, ivy poisoning is not borne by the air."

Do we thus disagree only about poison ivy, on which agreement should be more easily possible than on some other subject?

A Radio Contest—Prizes of \$20.00, \$10.00, and \$5.00 are offered for the

best radio sketch presenting the whole subject of public health nursing or any phase of it. The sketch may be in the form of a dialogue, a dramatic sketch, a playlet, a story, or a recitation of any kind; it may concern one patient or many, the preventive or curative side of the work, the state, county, or local program—but it must tell something of importance about public health nursing in a way that will make people listen, and be appropriate for the radio. It must not consume more than 12 minutes to present and therefore should not be longer than 1,500 words, shorter if possible. The contest is open to anyone. Individuals may send in as many entries as they wish. The three judges will represent the public health nursing field, the non-professional radio audience, and the radio broadcasting experts.

The contest closes midnight, October 15, 1933, and the winning sketch will be published in the December number of *Public Health Nursing*. It is hoped that it will also be possible to arrange for broadcasting the winning sketch—either locally or nationally as seems appropriate.

Manuscripts signed by a pen name should be sent to Contest Editor, *Public Health Nursing*, 450 Seventh Avenue, New York. They should be accompanied by a sealed envelope containing pen name and real name and address of the author.

#### REPORTING

"Statistical Summary for 1932," the April-June, 1933, issue of the *Bulletin* of the Detroit Department of Health is mimeographed "in the interest of economy." Twenty-three letter size pages, with cover.



"Twenty-five Years of Saving Sight" is the title of a report issued by the National Society for Prevention of Blindness, 450-7th Ave., New York. Striking gains during a quarter century are presented in attractive and quickly grasped picture diagrams, one of them on the cover. The brief illustrated review of 25 years occupies 3 pages preceding an 8 page annual report.

Hygeia for July, 1933—Some of the articles in *Hygeia*, 535 N. Dearborn St., Chicago, July, 1933:

"Sex Education (Ideals and Purposes)," "A Century of Progress" (A.M.A. exhibits), "Live Statistics," "Babes in the Woods" (vacation health problems), "Are Foods Truthfully Labeled?" "Safe Swims for Campers," "Training for Athletics and Health," "The Dangers of Spider Bites," "Eradication of Tuberculosis from Cattle," "Eye Hygiene—Eye Education," "Progress in Preventive Medicine," "Shoes Have Tongues," "Speaking of Hair," "School and Health" (a department).

#### DEPRESSION DISCUSSION

"An Illuminating Contrast" is a diagram and a page article emphasizing the per capita outlays in Kentucky for medicines *versus* public health. *Bulletin*, State Board of Health, Louisville, Ky. July, 1933.

"Essential Health Activities," a release from Iowa State Department of Health, quotes the AMERICAN PUBLIC HEALTH ASSOCIATION on the essential five types of activities, and then illustrates their significance in relation to the whole:

The State Department of Health provides that due emphasis be given to each of the above mentioned activities. To illustrate how these five essential functions are inter-related, the interest of the various bureaus in the newborn baby, pre-school and school child may be cited as an example. Child health is safeguarded by providing information and instruc-

tion for the mother which will enable her to give the child such care and training as will make possible his highest mental and physical development. Through the Bureau of Vital Statistics, complete and accurate birth registration is kept, as well as records indicating deaths which occur among children from such preventable diseases as diphtheria and tuberculosis. Contagion is prevented or controlled against further spread through the encouragement of immunization early in life, through the prompt reporting of infectious disease and through coöperation between the State Department of Health and health officers in local communities. Public health laboratories and sanitary engineers provide additional bulwarks of protection about child life, through the procuring and analysis of samples from public water and milk supplies and through various tests of specimens forwarded from those suspected of harboring disease germs. Through improvement of sanitation animal and insect-borne diseases are held in check.

#### SCHOOL—THE CHILD

"The Hunger Strikers," by Gertrude Thomas. *American Journal of Nursing*, 450-7th Ave., New York. Feb., 1933. Why some children don't eat certain foods and what might be done. 35 cents.

"Alcohol," by J. F. Rogers, M.D. *School Life*, Washington, D. C., May, 1933. 5 cents. "How changing liquor laws revive a teaching problem."

"Health-Service Activities," by W. A. Kincaid. *School Executives Magazine*, Lincoln, Neb. June, 1933. 35 cents. Includes case stories of "Typical Cases of Neglect."

"When the Baby Cries," by W. A. O'Brien. Minn. State Medical Assn. *Everybody's Health*, 11 W. Summit Ave., St. Paul, Minn. July, 1933. 10 cents. Radio talk.

#### MOTION PICTURES

The following new pictures are bulletined by the Department of Commerce, Washington, D. C.

"The House Fly": motion photomicrographs of structures of the house fly which help to make it a health menace. Dangerous habits, rapidly

of breeding and methods of controlling this filthy insect are shown. 15 minutes. Silent. 16 mm. Sold. Eastman Teaching Films, 343 State St., Rochester, N. Y.

"Good Hospital Care" dramatization of service in an approved hospital from the time the patient enters until she leaves. 22 minutes. Sound. 35 mm. *Free*. Distributed by American College of Surgeons, Chicago, and Petrolagar Laboratories.

"The Conquest of Diphtheria": story of diphtheria from the "onion poultice day" to the present positive methods. 15 minutes. Silent, 16 mm. and 35 mm. Metropolitan Life Insurance Co., 1 Madison Avenue, New York.

#### EDUCATIONAL MATERIAL

"Health Through the Ages," by C.-E. A. Winslow and Grace T. Hallock. Metropolitan Life Insurance Co., New York and Ottawa. *Free*. Selections from the table of contents will indicate the nature of this 64 page pamphlet; "Health in the Stone Age," "The Hebrew Health Code," "The Black Death," "The Lady with the Lamp," "The Secret of Contagion," "The Conquest of Yellow Fever." It has many audiences, and is a splendid contribution to spreading an appreciation of the scientific background of medicine and of public health.

The 1933 edition of "Books on Tuberculosis" lists all of the best English and American texts by subject, with an alphabetic author list. *Copy free*, *Journal of the Outdoor Life*, 450-7th Ave., New York, N. Y.

"Publications — Periodicals — Motion Pictures on Tuberculosis." 16 pages. *Free*. 1933 edition of catalogue of materials issued by National Tuberculosis Association, 450-7th Ave., New York, and available through state tuberculosis associations.

"Public Health Education: The

Functions of the University and of the Private Foundation," by John Sundwall, M.D. Reprint from *Public Health Reports*. Supt. of Documents, Washington, D. C. 5 cents.

"The Tuberculosis Problem in Missouri," by Dr. Scott P. Child. Reprint from *Journal of Missouri State Medical Assn.* Missouri Tuberculosis Assn., 2221 Locust St., St. Louis, Mo. 7 pages. 3 cents. Includes need of education (of medical profession; medical student, general public).

Single copies of the following (enclose 3 cents postage) will be supplied by Dr. J. W. Wisan, Council on Mouth Hygiene, N. J. State Dental Society, 1143 E. Jersey St., Elizabeth, N. J.:

"Give Him Good Health," an especially good 6-page *illustrated* folder "approved for distribution in public schools" in New Jersey.

"Who Should Present Dental Health Information to the Pupils?" by A. G. Ireland, M.D. Reprint from *Dental Cosmos*. May, 1933. Calls for team work.

"Mouth Health of School Children," by Pauline B. Williamson. Winning the coöperation of the children.

The National Society for the Prevention of Blindness, 450-7th Ave., New York, N. Y., offers the following reprints and original publications:

"Diet and Eye Health," by Walter F. King, Buffalo. 8 pages. 5 cents.

"Vision and Other Tests for Automobile Drivers," by Maxwell Halsey. 14 pages. 15 cents. Valuable study of drivers' examinations.

"What To Do for Cross-Eyes," by Dr. Walter Baer Weidler, New York. 2 pages. 5 cents. For nurses, social workers, parent-teacher associations.

#### IT MAY BE HERE

Circular letters are being mailed at irregular intervals to local milk producers and dealers by the Attleboro, Mass., Health Department. They are

friendly, straightforward explanations of new regulations and reminders of old ones. Copies supplied upon request.

"A Cough in the Night" is the title of a news release on whooping cough issued by Iowa State Department of Health.

A directory of "Whole-Time County Health Officers, 1933" appears in *Public Health Reports*, Washington, D. C., July 14, 1933. 5 cents.

"Informing the Public and Money Raising," by Alma C. Haupt. *Public Health Nursing*, 450-7th Ave., New York. 35 cents. "A resumé of recent methods in 65 public health nursing associations," with illustrations of a circular card telephone number record, and of a beaver board poster with bristol board cut-outs. Aug., 1933.

The June 28, 1933, "Letter to Periodical Publishers," National Better Business Bureau, Chrysler Bldg., New York, gives reports from Federal Trade Commission on Trigestia Tablets, obesity remedies, etc. Copies free to health agencies.

"A Memento of Public Health Work in the Eighties" reproduces what is probably the first official badge worn by a member of the State Health Department of New York. In *Health News*. July 17, 1933. A reminder of the news value of old publications, records and miscellaneous matters.

"The Public Health Nurse," by Dr. J. D. Dowling, Health Officer, Birmingham, Ala. In *Public Health Nursing*. Aug., 1933. Radio talk.

*Public Safety*, National Safety Council, 20 N. Wacker Drive, Chicago, for Feb., 1933, is interesting for its cover made up of newspaper clippings on a blue background; several picture diagrams; and its review of "Oddest Accidents of 1932" (quite readable, with quotable warning examples). 10 cents.

The 17th National Baby Week was held in England, July 1-7, 1933.

"She's Had the Doctor!" by W. E. Chase. *Atlantic Monthly*, Boston. June, 1933. 40 cents. Drama of the doctor's visit; low cost of medical care in early New England days; home remedies and superstitions.

"Speech Material," by Lena D. Dietz. *Trained Nurse*, 468-4th Ave., New York. July, 1933. 35 cents. Talk suggestions; brief outlines for a variety of talks.

"A Study of Mortality by Specific Causes of Death in Thirteen Large American Cities," by W. S. Groom. Public Health Federation, Cincinnati. "Introduction" and "Section 1—Scarlet Fever." 10 pages. First of a series. 10 cents. Comparative usable data.

Time is passing for the enrollment of your city in the Inter-Chamber Health Conservation Contest. Address the AMERICAN PUBLIC HEALTH ASSOCIATION.

#### HONORABLE MENTION

To National Health Library of National Health Council, 450-7th Ave., New York: for including the publication city with all periodical references in weekly issues of *Library Index*.

A Diphtheria Display Idea—V. T. Schuhardt, A.M., and S. M. Bohls, M.D., of the State Hygienic Laboratories, Austin, Tex., have developed a placard display against diphtheria. It is an adaptation of the Hamilton, Ontario, display illustrated in the *Journal*, August, 1932.

Statistics as to cases and deaths before and after introduction of immunization, is emphasized at the base by rows of crosses representing deaths in selected years.

Supplementary to the Hamilton comparison are two outline maps of Texas, one crowded with crosses for 1931, the other questioning the number to be expected in 1941.

Address the authors for the loan of a photograph.

## BOOKS AND REPORTS

**Medical Biology.** A Laboratory Manual of Bacteriology, Mycology, Immunology and Parasitology; Consisting of Experimental Guide, Interpretive Text, Atlas and Protocol Form—By *William Barnard Sharp, M.D. Galveston: Medical College Edition, 1933. 443 pp. Price, \$4.50.*

This book has apparently been the product of courses as given by the author under rather peculiar local circumstances in the school from which the publication comes. It is doubted that it would find adaptation in similar departments of other schools.

There are some commendable features, especially in the diagnostic and clinical discussions, which are of practical value. There are some mistakes in spelling, as "hemaphroditic." In the paragraph, "Fertilization with Night-soil" occurs the ambiguous statement, "That with animal manure does no harm, because germs of intestinal infection in man do not affect the domestic animal . . . ."

In some respects, the material is quite elementary for students in a school of medicine. It is not strictly a text for use in bacteriology, for it contains considerable non-bacterial matter. As a laboratory book or guide, or as a notebook for recording observations and conclusions, it is too voluminous in didactic material. In many instances where details should be given, they are deficient or absent. Under the description of blood cultures, no detail of the procedure is given for culturing quantities of blood in fluid medium, which is the only one of practical value. The plate method of blood culture, which is given in detail, is often not satisfactory in clinical medicine. The same may be

said of the plate culture of urine in typhoid fever.

Droplet infections, diphtheria of wounds, and a number of similar common conditions are not mentioned. Under "Milk Borne Disease," undulant fever receives no mention.

The statements in the chapter, "The Tubercle Bacillus" that the bovine variety infects infants and young children about as often as the human, and that aside from the occasional alimentary or meningeal infection, the bovine type is relatively mild and usually of lymph glands only, are not in conformity with the impression held by most authorities.

The author has made a commendable effort in illustrations of his personal production, but unfortunately many of these fail to illustrate. The absence of a scale for illustrations is always a fault. Numbers of the illustrations are ill-chosen, too small, reveal a lack of contrast, and fail to reveal the object to be shown. The wide use of photomicrographs to show morphology of bacteria, such as the types of staphylococci or the Gram negative bacilli, is unfortunate when there are in reality no morphologic differences in these groups possible of being shown in the illustration. M. PINSON NEAL

**Reports, National Quarantine Service, Series III—1932—Edited by Wu Lien-Teh and Wu Chang-Yao.**

The Chinese National Quarantine Service has issued recently the third in a series of annual reports inaugurated in 1930, which shows in a very interesting manner the work accomplished and the progress made by this comparatively new organization during the past year in spite of almost insurmountable ob-

stacles resulting from military operations involving a considerable part of the country. Consistent improvement is manifested each consecutive year in the three annual reports issued to date. The English text of the third report is most excellently written and contains very interesting data, intelligently and entertainingly presented.

The preliminary results of rat and rat-flea surveys of several principal ports are published in this volume. For the first time in the history of the country, a systematic rat-flea survey of the principal ports of China was undertaken, with the intention of continuing the work until accurate data have been assembled concerning the species of rats and rat fleas found in the various ports.

Research into many other problems of port health is being conducted, and the report shows that routine work of inspection and fumigation is being placed on a more methodical basis in the nine ports in which the Service is now operating. The port health services of Tientsin, Taku-Tangku, and Chinwangtao were formally taken over by the National Quarantine Service on April 6, 1932, making a total of nine ports now under the control of the Service.

The report presents a brief history of the Manchurian Plague Prevention Service, which has enjoyed an international reputation in scientific circles through the work of its modern research institute and unique plague museum, but which now practically exists in name only as a result of the military occupation of the North-Eastern Provinces which culminated in the seizure of all the public services hitherto functioning there under the Central Government. The headquarters of that Service, however, have been transferred from Harbin to Shanghai, where an effort is being made to continue the work under the new conditions.

The results of a survey made of plague in wild rodents and of a new survey of pneumonic plague, which would ordinarily have been published in the reports of the Manchurian Plague Prevention Service, are presented through the medium of the *Annual Report of the Chinese National Quarantine Service*. The new evidence collected in these surveys tends to show more clearly than ever the great extent to which wild rodents are involved in the perpetuation and spread of plague. The report expresses the hope that the new anti-plague serum which has given such promising results in the treatment of bubonic plague in India will also prove to be useful at least in the prevention, if not the treatment, of the pneumonic type.

During the past year, the resources of the Chinese National Quarantine Service were taxed to the utmost by the devastating cholera epidemic which invaded 23 provinces and 312 large cities of China, with a death toll of nearly 34,000, and by the outbreak of small-pox which occurred in Amoy. Detailed accounts of both epidemics are given. Encouragement is found in the fact that the intensive anti-cholera measures which were taken in Shanghai resulted in that city having the lowest mortality rate of any of the large cities involved, though it had the largest number of cases.

Interesting chapters are included on "Some Aspects of Modern Quarantine," "Port Health Work in Singapore," and "Refugee Relief and War Casualty Work in Shanghai." The volume is brought to a conclusion by the incorporation of detailed reports of the Boarding, Fumigation, and Medical Services Divisions, and of several of the port quarantine stations at present under the supervision of the national quarantine service. Instructive data are furnished in the form of tables, charts, and maps, and a large

number of illustrations add to the interest in the publication. A note of optimism runs through the entire report, and the reader is left with the impression that no opportunity will be lost by the Service to attain high efficiency.

F. A. CARMELIA

**The Approach to the Parent: A Study in Social Treatment—***By Esther Heath. New York: Oxford University Press, 1933. 163 pp. Price, \$1.25.*

In dealing with personality deviations and behavior disorders in children, the one outstanding finding is a faulty relationship between one or both parents and the child. The therapy therefore consists, to a large degree, in treating the parents. This is well exemplified in the handling of the four boys whose problems are set forth in this book. It clearly shows that successful results are obtainable if a worker is capable of evaluating the material and proceeding accordingly.

By contrasting the social technic of 8 years ago with that employed at the present time one readily sees the strides that have been made in social case work.

The author stresses the all important therapeutic fact of the relationship between worker and client, and one closes the book more firmly convinced that the situation between the person who gives help and the one who seeks it is a recapitulation of life's patterns, and the outcome of this relationship is, to a large extent, a determiner of future relationships of the patient, whether he be an adult or child.

The cases presented are somewhat typical of the intake of a Child Guidance Clinic and if carefully read the contents of the book show the methods and time necessary for good results.

The advantage of including the Summary of Clinic Findings and Recommendations in the appendix is questionable because the reader's task

is less easy. However, such an arrangement prevents the presentation from resembling the usual topical case history as the material is presented chronologically. This arrangement also affords the author the opportunity of giving the facts in a less stereotyped manner and wording.

To those who are interested in social therapy of problem children, to the sceptics who doubt that a social worker can do anything, and to the uninformed who wonder how applied psychiatric social work can transform a "bad boy into a good one," the book will be of value.

ELIZABETH I. ADAMSON

**Nervous and Mental Diseases for Nurses (2d ed.)—***By Irving J. Sands. Philadelphia: Saunders, 1933. 281 pp. Price, \$1.75.*

This book starts out in the old stilted way to give a long description of Elementary Neuro-Anatomy, on which it is very difficult to concentrate. Speed the day when people who write textbooks will start with the specific and then go on to the general!

The best and clearest chapters are "The Glands of Internal Secretion" and "Psychoanalysis for Nurses." The author commendably puts a great deal of emphasis on the prevention of nervous and mental diseases, and his chapter on Mental Hygiene shows he is thoroughly up-to-date on this.

A more readable and a more effective book on this subject would give the nurses more of the philosophy of dealing with patients suffering from nervous and mental diseases. They need a little inspiration.

Many pages are hard to read because the text lacks sufficient subheads and italics. Moreover, in these days when many nursing schools are giving their freshmen courses in English it seems a shame that any textbook they read has not paid careful attention to correct English.

EVA F. MACDOUGALL

**Stop That Smoke!**—By *Henry Obermeyer*. New York: Harper & Brothers, 1933. 289 pp. Price, \$2.50.

Mr. Obermeyer has accumulated an amazingly large amount of information and has set it forth in interesting and carefully arranged order. He is trained in journalism and is assistant to the Vice-President of the Consolidated Gas Company of New York.

The connection between smoke and disease as given is, in part, as follows:

Any agency that is capable of crumbling a skyscraper and withering a tree may be said to admit of some harm, at least, to the human anatomy. Almost every type of respiratory disease is aided and abetted by the presence of smoke. When the delicate membranes of the eyes, nose, throat and lungs are cut by sharp particles of unburned cinder and irritated by noxious gases, while the breathing-space of the lungs is clogged and blackened with soot, it may be imagined that these organs readily become favorable soil for bacterial and other infections. . . . Today there is almost a direct ratio between the incidence of smoke and pneumonia. A similar relation is seen in the prevalence of rickets. . . .

There are chapters on the harm done to property and health by smoke; the legal, administrative and economic aspects of smoke abatement; and the practical measures which should be taken to secure the proper consumption of fuel.

One of the most helpful parts of the book is the one which deals with the means of carrying on the war against smoke, as illustrated by the experience of many cities, including Chicago, Cincinnati, Pittsburgh, Rochester, Buffalo, Boston, Nashville, Atlanta, and Indianapolis.

The "most promising development of recent date" is considered to be the organization of a Pure Air Committee under the auspices of the American Association of Mechanical Engineers to direct and coördinate present and

future problems relating to air contamination, develop model smoke laws, and serve as a clearing house for research.

There are 8 pages devoted to a bibliography of smoke fighting, and an unusually full index.

GEORGE A. SOPER

**Broadcasting Health**—By *J. Mace Andress, Ph.D., and I. H. Goldberger, M.D.* Boston: Ginn, 1933. 401 pp. Price, \$.80.

In few fields are recent changes more evident than in school texts for teaching hygiene. The old books on physiology with their anatomical data and lurid descriptions of the interior of a drunkard's stomach have given way to attractive texts, more accurate and far more likely to appeal to the pupil.

The book under review takes advantage of the modern child's familiarity with and interest in radio to throw a glamor about facts of everyday hygiene. Furthermore it is possible for the teacher to turn the printed story into actual reality in the schoolroom by encouraging the pupils themselves to put on a similar broadcast.

The scope of the book is "the whole subject of foods in relation to health and civilization." It is planned for older children below high school age. Controversial subjects like alcohol and tobacco are handled discreetly enough to pass muster with the W.C.T.U. on the one hand and the medical society on the other. The authors do not hesitate to recommend pasteurized milk—though, perhaps, more explanation might have been given as to the reason for pasteurization.

As for the English—well, let us hope that sometime the school child will be as careful of his speech as were the children of the Work Together Room of the Abraham Lincoln School. At least the text sets a good example.

MERRILL CHAMPION

Obstetrics for Nurses—By Joseph B. DeLee. (10th ed.) Philadelphia: Saunders, 1933. 666 pp. Price, \$2.75.

The first edition of this book came out in 1904. All these years this text has been widely used in nursing schools all over the country. The other editions taught predominantly obstetrics as practised in the hospital; this 10th edition puts the paramount emphasis on obstetrics in the home, for, as the author says in the preface, "2,100,000 babies are born in the United States every year, and 1,500,000 are born in their own homes."

Extra emphasis is put on diet in

pregnancy, on the mental hygiene of the gravida and on the ways of preventing puerperal infection, the toxemias and complicated labor. The author sees clearly the public health aspect of the whole field of obstetrics, and, what is more, knows and understands nurses and gets their point of view. He knows they need encouragement and a little philosophy sometimes.

Public health nurses will like the book because of the appreciation it displays of the visiting nurse's rôle in the progress toward better obstetrics.

The book can be recommended unequivocally to all nurses.

EVA F. MACDOUGALL

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Health Hazards of Sandblast Dust—Protective outfits for sandblasters were found to vary greatly. Helmets with a positive air supply of six feet of air per minute protect the worker adequately. Properly designed equipment can prevent dangerous dustiness.

BLOOMFIELD, J. J., and GREENBURG, L. J. *Indust. Hyg.* 15, 4:184 (July), 1933.

Recurrence of Milk-Borne Tragedies—The usual varieties of milk-borne communicable disease epidemics are spread before us. Cheese furnished a particularly virulent typhoid fever epidemic, so that, though the number of cases of communicable disease produced in 1932 was less than the previous year, the number of deaths was greater. This annual statement is a valuable reminder.

CRUMBINE, S. J. Epidemics from Infected Milk, Ice Cream and Cheese in 1932. *Child H. Bull.* 9, 4:124 (July), 1933.

How Shall We Measure Antirachitics?—Irradiated milk seems to be the most desirable antirachitic agent

for large scale prevention, conclude these authors who compared it with milk from yeast-fed cows, cod liver oil, and viosterol. They found such discrepancies between clinical units (as measured in results) and rat units that the latter may well be considered misleading.

HESS, A. F., and LEWIS, J. M. An Appraisal of Antirachitics in Terms of Rat and Clinical Units. *J.A.M.A.* 101, 3:181 (July 15), 1933.

Stiffness and Heat Sources—Another study of the effect of dull heat upon mucous membranes. Adequate ventilation or radiant heaters will prevent the "stiffness" caused by excessive heating with dark sources of heat.

HILL, L. Infra-Red Rays, Comfort and Health. *Brit. M. J.* 3781:1096 (June 24), 1933.

Favorable Experience With Whooping Cough Vaccine—Pertussis vaccine administered before an epidemic reduced the mortality from



whooping cough to one-sixteenth of the rate among the control group in this experience in the Faroe Islands.

MADSEN, T. Vaccination Against Whooping Cough. *J.A.M.A.* 101, 3:187 (July 15), 1933.

on this side of the water, where they claim the problem is so much simpler.

SAVAGE, W. G., Vs. GOLLEDGE, S. V. The Prevention of Human Tuberculosis of Bovine Origin. *J. Roy. San. Inst.* 54, 1:11 (July), 1933.

#### Yardsticks for Health Projects—

Dare we measure the effects of our pet programs in public health, if they can be measured? This writer has the temerity to conclude: "The national bill for public health education is a sizeable one. Of course, we think it ought to be larger. Would it not be economical in this time of depression to find out whether we are actually accomplishing by our efforts what we think we are accomplishing?"

PALMER, G. T. Measurement in Public Health. *Child H. Bull.* 9, 4:117 (July), 1933.

Why B. Tuberculosis Remains in the British Milk Supply—Difficulties encountered in ridding Great Britain's milk supply of tuberculosis are enlarged upon in the contrast of ideas of a health officer and a veterinarian. Both cast envious eyes toward the results achieved

#### British Influenza Research—

Throat washings from influenza patients instilled in the noses of ferrets produced a disease transmissible serially. Throat washings from convalescents or patients with ordinary colds produced nothing. Human convalescent sera neutralized the virus.

SMITH, W., *et al.* A Virus Obtained From Influenza Patients. *Lancet* 225, 5732:66 (July 8), 1933.

Immunizing Against Diphtheria With One Shot—One intramuscular injection of a concentrated diphtheria toxoid in woolfat immunized 99 per cent of 103 patients within two months. The practical advantages of this method are obvious, if it proves its value in wider experience.

STRAUS, H. W. Active Immunization Against Diphtheria. *J.A.M.A.* 101, 3:19 (July 15), 1933.

## BOOKS RECEIVED

BIOLOGY OF THE PROTOZOA. 2d ed. By Gary N. Calkins. Philadelphia: Lee & Febiger, 1933. 607 pp. Price, \$7.50.

FOOD AND DIETETICS. 7th ed. By Robert Hutchison and V. H. Mottram. Baltimore: Wood, 1933. 630 pp. Price, \$7.25.

MILK. THE INDISPENSABLE FOOD. By James A. Tobey. Milwaukee: Olsen, 1933. 200 pp. Price, \$2.25.

FRONTIERS OF MEDICINE. By Morris Fishbein. Baltimore: Williams & Wilkins, 1933. 207 pp. Price, \$1.00.

NUTRITION. By Graham Lusk. New York: Hoeber, 1933. 142 pp. Price, \$1.50.

KEEPING THE POOL SAFE AND SANITARY. New York: Mathiesen Alkali Works, 1933. Free.

DICTIONARY FOR NURSES. 2d ed. Compiled by Lois Oakes. Philadelphia: Reilly, 1933. 351 pp. Price, \$1.00.

PROCEEDINGS OF THE FIRST INTERNATIONAL CONGRESS ON MENTAL HYGIENE. Held at Washington, D. C., May 5th to 10th, 1930. Edited by Frankwood E. Williams. New York: International Committee for Mental Hygiene, 1932. Two volumes.

THE ROAD TO HEALTH. By Herman N. Bundesen and Corinne Manry. Chicago: Laidlaw, 1932. Book I, 96 pp. Price, \$.52. Book II, 125 pp. Price, \$.56.

WHAT SHALL I EAT? By Edith M. Barber. New York: Macmillan, 1933. 106 pp. Price, \$1.75.

# NEWS FROM THE FIELD

## ASSOCIATION WOMEN IN PUBLIC HEALTH

ADA E. SCHWEITZER, M.D., *President*

*International Congress of Women, Chicago, July 16-22, 1933*—The Association of Women in Public Health, a member of the National Council of Women, was represented at the International Congress of Women by the President, Dr. Ada E. Schweitzer, and by Dr. Mary R. Lakeman, Chairman of the exhibit committee.

The Healthknowmeter exhibit displayed there was designed by Dr. Lakeman to make easily available to the public, details of information on public health subjects. On the wall over the exhibit table hung a large poster with numbered questions concerning health, such questions as are frequently asked of public health officials. A file box on the table contained cards answering the questions. The index cards bore numbers corresponding to the numbers

on the poster. The following outline indicates the subjects included in the Healthknowmeter box: (1) Child Health, (2) Adult Health, (3) Health Education, (4) Parent Education, (5) Community Organization, (6) Hospital Service, (7) Laboratory Service, (8) Preventive Medicine, (9) Nutrition, (10) Social Service, (11) Public Health Nursing, (12) Mental Hygiene, (13) Opium, (14) Cancer, (15) Courses of Study.

Many persons visiting the exhibit were impressed with its possibilities of usefulness as an aid to students and to others wishing information. Outlines are being sent on request to all who left names and addresses. The Healthknowmeter will be displayed at the Indianapolis meeting of the American Public Health Association in October.

### ADENOIDS AMONG SCHOOL CHILDREN OF NAPLES

AS a part of a general campaign against adenoids in Italy, according to a recent report, 77,000 elementary school children were examined in Naples, and 12,000—about 15 per cent—were found to have enlarged or diseased adenoids. Of the children with this defect almost one-half had to repeat the work of their school grades, and the quality of the work done by the children with the more severe cases was particularly bad. As a result of treatment, which was provided in most cases free of charge at public clinics, the number of "repeaters" has been reduced by almost half, with a considerable saving in the school budget; a great improvement has also been

found in the children's physical development, their general well-being, and their resistance to disease.—*Difesa Sociale*, Rome, Feb., 1933.

### SPANISH CHILD HEALTH CENTERS

AS a means of combating the high rate of infant mortality the Government of Spain issued an order on March 30, 1933, for the establishment of a child health center in the capital of each province. These centers are to serve not only the cities in which they will be situated, but also the surrounding territory. Expectant mothers will be given advice with regard to prenatal care, and those without means will be provided with attendants at childbirth, in an effort to prevent puerperal infection. The infant health

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

October, 1933

Number 10

## Radium Poisoning A Review of Present Knowledge\*

ROBLEY D. EVANS, Ph.D.

*National Research Fellow, Physics Department, University of California,  
Berkeley, Calif.*

IN some circles victims of radium poisoning are regarded as curiosities, and the view advanced that careful studies of the cases—particularly such fundamental studies as the distribution of radium in the system—are of secondary importance. This view arises from the fact that most of the reported cases arose from uninformed carelessness in one occupation, luminous watch and instrument dial painting, in which protective measures have now been taken.<sup>1, 2</sup>

The view is untenable, however, for three reasons (1) Careful study of the distribution of radium in victims can contribute to knowledge of bone architecture and to the investigation of analogous heavy-element poisoning cases, such as lead and arsenic. Study of the anemias involved has already led to major contributions by Martland. (2) New cases will continue to appear because some physicians are still experimenting with radium solutions for therapeutic uses; because radium solutions are still peddled by the nostrum

vendors, who realize splendid profits therefrom; and because radium "activators" for the treatment of drinking water—some of which are dangerous—are still sold in large numbers to a gullible public. (3) Thus far every case of radium poisoning has been fatal, but there is no *a priori* reason for believing that a satisfactory cure will never be found.

Cases of true radium poisoning arise where the victim has taken radium into the body, by mouth or by injection, in which case a fraction of the radium taken remains permanently in the body, and the radiation which it continually emits produces the effects described as radium poisoning. It must be emphasized that the modern use of radium in the treatment of cancer usually involves an entirely different mode of use of radium, and cannot result in true radium poisoning. Since only the penetrating gamma radiation of a radium product is utilized, the radium never enters the patient's system, and the exposure is of definite, limited duration. Over-doses of gamma rays will produce pernicious anemia and myeloid leukemia as late as 4 years after a massive exposure,<sup>3</sup> but these

---

\* Read at the Fourth Annual Meeting of the Western Branch, American Public Health Association, in Pasadena, Calif., May 30, 1933.

effects are to be regarded as radiation burns rather than as true radium poisoning.

Each of the 40 known radioactive elements has a definite rate of spontaneous disintegration which cannot be altered by invoking extremes of temperature or pressure, or by chemical combination. When an atom of radium explodes it emits an alpha ray, a high-energy, doubly-charged helium nucleus, which will traverse a few hundredths of a millimeter of living matter, and is only brought to rest by expending its energy in ionizing about 100,000 atoms. Gamma rays, similar in nature to X-rays, are also emitted.

The exploding radium atom loses mass, electrical charge, and energy in the emitted alpha and gamma rays. The residue is an atom of radon, a heavy, inert, radioactive gas, which can be observed in the air expired by a victim of radium poisoning.

Half of any given quantity of radon decomposes in 3.8 days, the so-called "half-period." Radon is the principal active agent in the water from radioactive springs and drinking water activators, but its short half-period shows that bottled water will become practically free from radon in about 3 weeks.

Radium, because of its relatively long half-period of 1,600 years, cannot disintegrate rapidly enough to be appreciably reduced in amount during the lifetime of a person. Hence radium, once fixed in the bones of a victim of radium poisoning, holds its deadly alpha ray bombardment of the bone structure and of the blood producing centers at a nearly constant rate.

Radium decomposes into radon. Radon, in turn, decomposes into an element called radium A, and this in turn into radium B, radium C, radium C', radium D, radium E, and radium F (polonium), which disintegrates into lead, the stable end-product of this

decay series. In the gamma ray treatment of cancer, the gamma ray of radium C is principally employed.

Radium is chemically quite similar to barium, hence also to calcium. Efforts to remove radium from the body of a victim of radium poisoning must therefore involve mobilization of the calcium, and must borrow heavily from the body of knowledge which is calcium therapy.

In cases of radium poisoning, at least one other radioactive element is of major importance, because it has been widely used in luminous paint and in radioactive nostrums. It is called mesothorium-1, is a beta ray emitter with a half period of 6.7 years, and, like radium, gives birth to a long chain of radioactive substances, one of them gaseous (thoron), five of them alpha ray emitters, four more beta ray emitters, and has lead as its stable end-product.

As in the case of the radium series, the presence of these radioactive decay products multiplies, in proportion to the number of alpha ray products, the destructive effects which could be produced by radium or mesothorium-1 alone.

The term radium is used in this paper as a convenient abbreviation of the long list of radioactive elements which accompany it, and the effects of mesothorium-1 or of radiothorium are the same.

#### MODES OF ENTRANCE OF RADIUM INTO THE BODY

It is now possible to distinguish between radium water and "activated" water. The former contains actual radium salts (usually the chloride) which, because of the long half-period of radium may be regarded as permanently radioactive. The radium spring waters, and "activated" waters from emanators and other devices are merely radon water, that is, they contain the short lived radioactive gas radon, which, like all other gases, dissolves in liquids

to a limited extent. These waters go dead in a few weeks unless they are continually reactivated.

A. Numerically, ingestion has been far more important than injection in producing victims of radium poisoning. Public<sup>4</sup> and professional<sup>5</sup> attention has been well focused on the tragic and horrible death of E. M. B. and several of his friends as a result of their drinking the radium water nostrum "Radithor."<sup>4, 5</sup> For the first few months after taking radium into the body there is a sensation of well-being and general physical improvement. Soon, however, the deadly alpha ray bombardment of the blood producing centers begins to be felt, and death follows in a year or more, depending on the total quantity of radium fixed in the system. Protection of the public from these nostrums is mainly a matter of public health education and legislation.

B. Although the greatest number of victims came out of the luminous watch dial industry, this source has been quite well stopped by the introduction of machinery and of protective measures where hand work is still necessary. From the war period until the end of 1924 an average of some 350 persons, mostly women, were employed in hand painting luminous numerals and hands on watches, clocks, airplane instruments, etc. Due to labor turnover probably about 800 people worked long enough to endanger their lives. In painting the numerals on a fine watch, for example, an effort to duplicate the shaded script numeral of a professional penman was made. The 2, 3, 6 and 8 were hardest to make correctly, for the fine lines which contrast with the heavy strokes in these numerals were usually too broad, even with the use of the finest, clipped brushes. To rectify these too broad parts, the brush was cleaned and then drawn along the line like an eraser to remove the excess paint. For wiping and tipping the

brush the workers found that either a cloth or their fingers were too harsh, but by wiping the brush clean between their lips the proper erasing point could be obtained. This led to the so-called practice of "tipping" or pointing the brush in the lips. In some plants the brush was also tipped before painting a numeral. The paint so wiped off the brush was swallowed.

The luminous paint is a mixture of a gum binder, zinc sulphide, and enough radium, mesothorium-1, or radiothorium to give the required fluorescence. The mixture is about 1 part of radioactive material in 40,000 of paint.<sup>6</sup> Depending on their skill, the workers tipped the brush from 1 to 15 times per dial, and painted 250 to 300 dials per day. A worker who licked 1 mg. of paint from her brush 4 times per dial, 300 dials per day, 5 days per week, would therefore ingest about 4,000 micrograms of radium in 6 months. When fixed in the bones, as little as 2 micrograms of radium has been fatal. Only rapid elimination of ingested radium, mainly in the feces, prevented prompt death.

C. Radium solutions have been used by some physicians in treatment of such ailments as gout, arthritis, cancer and leukemia. A fraction of the radium is deposited in the erythrocyte and leukocyte producing areas, and irritates these parts, with the result that there is an increase of both red and white blood corpuscles, and an apparent improvement in health. A period of overstimulation and then one of exhaustion may follow in which there is marked leukopenia and regenerative anemia, followed by fatal terminal infections. Apart from these effects on the blood forming apparatus, radioactivity has never been proved to be a specific therapeutic agent in internal medicine.<sup>7, 8, 9</sup>

D. Those who, in hospitals, chemical or physical laboratories, or mines, handle radium solutions, make up radon

needles, or otherwise come in contact with radioactive dust or radon contaminated air, have been victims of fatal anemia in which radioactive substances were introduced through their lungs.<sup>7, 10</sup>

E. Fortunately, most of the radium "activators" sold for treating drinking water contain far less radium than their vendors claim.<sup>31</sup> So far as I know, no deaths have been traced to these devices; but in spite of years of trial, there is no controlled clinical evidence that this radon water is beneficial.<sup>11</sup> Those activators in which the water comes in contact with the radioactive source become dangerous when this material is appreciably dissolved in the water,<sup>10</sup> for here one would be drinking radium water—not radon water. The better grade of "activators" will produce a radon concentration of 0.01 microcurie \* per liter in water in 1 day, or 0.15 microcurie per liter in 1 month. As normally used, the water will have a radon concentration of about 0.1 microcurie of radon per liter, and also 0.0001 microgram of radium per liter.

#### EXIT OF RADIUM FROM THE BODY

The normal body throws off a large percentage of any radioactive material taken into it.

Where radon is breathed in, it remains in the blood only about 3 hours.<sup>10, 12, 13</sup> Where radon water is drunk, the gas is carried by the blood to the lungs, where it passes out by diffusion and is soon lost from the body in breathing.<sup>14</sup> The equilibrium distribution ratio (Henry's law constant) between blood and air at body temperature is between 0.42 and 0.31 to 1 by volumetric concentration.<sup>15, 16</sup> During the few hours that radon is in the blood, about 1 or 2 per cent of it decays into the solid radioactive product

radium A, some of which is deposited permanently in the system and continues in the radioactive decay series until, after emitting 4 alpha and 4 beta particles per original atom of radon, it eventually becomes lead.

When radium is taken into the system it behaves in a manner similar to lead, being carried in the blood until it is either deposited as colloidal matter, principally in the bones, marrow, spleen, liver and lungs, or is excreted. After taking a soluble radium salt by mouth a much greater fraction is eliminated in the first 4 days than if it is received by intravenous injection.<sup>14</sup> Thereafter the rate of elimination of radium is quite independent of the mode of entrance. According to the individual, from 2 to 35 per cent of the radium received by mouth remains in the system more than 5 days after ingestion,<sup>14, 17</sup> while 55 to 65 per cent received by intravenous injection remains more than 5 days.<sup>14</sup> By the 10th day after taking radium, the rate of elimination is below 1 per cent of the quantity remaining in the system. Several years after taking radium the rate of elimination is down to 0.002 to 0.005 per cent per day.<sup>17</sup> At this low rate it would require about 45 years to eliminate half the radium in the system.

About 90 per cent of the radium eliminated is excreted in the feces, the remaining 10 per cent in the urine.<sup>14, 17</sup> No radium is eliminated through the skin, as has been demonstrated by heavy sweating of a subject following an intravenous injection of 100 micrograms of radium.<sup>18</sup> Although no radium can be exhaled in the breath, some radon does leave the system in this way, thereby relieving the body of the severe alpha particle bombardment from the decay products of radon. The fraction of the radon expired varies between the extreme limits of 2 and 40 per cent<sup>17, 19</sup> of the total amount of radon produced in the body by the decay of radium.

\* When radioactive equilibrium is present one curie of radon is associated with each gram of radium. Micro- = one millionth.

Efforts have been made to speed up the normal rate of elimination of radium. Martland<sup>7</sup> tried without results to mobilize the radium deposits by intravenous injections of rapidly oxidizing colloidal solutions and by exposure of the body to ultra-violet light.

Aub found that a temporary acidosis, induced by the use of ammonium chloride, converted insoluble calcium and lead salts into soluble salts and expedited their excretion, particularly if the subject was on a low calcium diet. Following the original work of MacCallum and Voegthlin, and later of Collip, Aub<sup>20</sup> found that the injection of parathormone mobilized calcium and lead. Because the chemistry of calcium and radium is somewhat similar, Flinn and Seidlin<sup>21</sup> inferred that advantage could be taken of this knowledge of calcium metabolism to speed up the normal elimination of radium. In 1929, 3 patients were each given parathormone every other day for a month, the dosage beginning at 10 units and working gradually up to 40 units per day. After a 2 weeks' rest, the treatments were continued, with 40 to 50 units injected every other day for 2 weeks. The 3 patients originally carried about 10, 20, and 40 micrograms of radium respectively; each patient lost about half of her radium during the treatment, gained weight and improved in general condition. One has since died of a brain tumor, the other 2 are still alive, but not in good health. Later, Flinn<sup>22</sup> reported that 20 drops of viosterol given 3 times a day considerably hastened the elimination of radium. The mobilization of radium through calcium therapy seems at present to hold the only rational hope for the treatment of radium poisoning.

#### SYMPTOMS

In September, 1924, Dr. Theodore Blum, a New York dentist, reported<sup>23</sup> his belief that a case of osteomyelitis

of the mandible and maxilla, in a dial painter, which appeared similar to phosphorus necrosis, was in reality due to the action of radioactive substances taken into the mouth. The failure of the jaw to heal after the extraction of teeth, and the development of necrosis and osteomyelitis of the jaw is not only the condition which led to the first identification of radium poisoning, but remains today one of the first symptoms noticed in new cases.

The same symptoms are exhibited by victims of radioactive water nostrums<sup>5</sup> and by dial painters.<sup>7</sup> Symptoms may fail to appear until several years after the ingestion of radium has been discontinued. These facts lend weight to the belief that the jaw and mouth are slightly less resistant to radioactive bombardment than are other parts. Gingivitis, buccal infection, bone necrosis and osteomyelitis, low blood pressure, and regenerative anemias resembling true pernicious anemia are the most common symptoms of radium poisoning. X-ray examination will often disclose sharply circumscribed, nearly circular areas of rarefaction in the skull.<sup>21</sup> Particularly in the cases which have long resisted the alpha ray bombardment of radioactivity, radiation osteitis and osteogenic sarcoma, often accompanied by slow-healing, spontaneous fractures, are quite generally present.<sup>24</sup>

The occurrence of pregnancy is possible in victims of radium poisoning. The administration of ether anesthesia to victims of radium poisoning has been fatal in 3 cases.

For a more detailed discussion of the symptomatology of radium poisoning the reader should consult the excellent papers of Martland<sup>7, 24-28</sup> and his co-workers.

Here it will suffice to point out that in cases where a radium history is suspected, the physician need never remain in doubt as to the presence of radium poisoning. Regardless of the presence

or absence of pathologic symptoms, the physicist offers at least 6 unambiguous physical laboratory tests for radium poisoning in living persons, only 2 of which (2 and 3 below) demand the presence of the patient in the laboratory.

1. Rapid and very sensitive, is the ionization-chamber-electrometer test of expired air for the presence of radon or thoron.<sup>7, 14, 19</sup>

2. The gamma ray ionization-chamber-electrometer test for penetrating gamma radiation from the patient's body is widely used, and is best able to give a quantitative idea of the total amount of radioactive material contained in the system.<sup>7, 17, 19</sup>

3. The Geiger point-counter and the Geiger-Müller tube-counter are sensitive, low pressure, electrical instruments which discharge when a radiation passes through them. When connected to a vacuum tube amplifier and a radio loud speaker they register as clicks in the speaker the number of quanta of radiation effective in them. Such an instrument placed near a victim's body will show a noticeable response to gamma radiation from the patient.

4. A small fraction (*ca* 0.005 per cent daily) of the radium in a victim is eliminated daily in the feces. Sensitive emanation electroscope methods<sup>17, 29</sup> can be used for detecting radium in a solution of fecal ash. With proper apparatus, this method is extremely sensitive.

5. About one-ninth as much radium is eliminated daily in the urine as in the feces. Urine ash can also be tested by the emanation method.

6. Where a dentist has removed a tooth or a sequestrum from the jaw, radioactivity, if present, can easily be detected by at least 4 methods: the gamma ray ionization chamber, the Geiger or Geiger-Müller counters, the alpha ray emanation electroscope, or by self-photography due to the action of its beta and gamma rays on a photographic plate.<sup>5, 26, 39</sup>

#### DISTRIBUTION OF RADIUM IN SYSTEM

Radioactive material tends to be phagocytized into the bones, marrow, spleen and liver. Because of its bearing on other heavy-element poisoning cases, the study of the distribution of radium in a victim of poisoning can be of considerable value. These can be carried out with some precision, because

radioactive quantitative analytical methods are over a million times as sensitive as ordinary inorganic analytical technic.

A total of from 2 to 180 micrograms of radium in the entire body has been measured in the fatal cases to date. Depending on the resistance of the individual's system, from 2 to 10 micrograms of radium, when fixed in the system, is a fatal dose.

The radioactive self-photographs of the bones of deceased victims show a lack of uniformity of distribution of radium.<sup>26, 30, 32</sup> In some cases two or three small areas will be brilliantly self-photographic, while the remainder of the bone will display only a moderate amount of fairly evenly distributed radiation. This irregularity of distribution is important as an independent fact, as well as a warning that an analysis of a fragment chosen at random may not be representative of the entire bone from which it came.

Post-mortem radium analyses have been made on individuals who acquired

TABLE I

	I	II	III
Vertebrae	100	100	100
Jaw	...	51	20
Femur	...	48	27
Tibia	...	30	...
Skull	...	18	...
Rib	...	...	11
Teeth	...	...	46
Heart	0.5	...	0.04
Brain	...	0.4	...
Stomach	0.0	...	...
Liver	65.0	0.5	0.05
Intestines	2.0	...	...
Spleen	8.4	0.9	0.05
Lungs	17.0	2.2	0.04
Kidneys	0.4	...	0.17

I. Diagnosis, Cancer of Uterus. One milligram radium injected Sept. 1, 1913. Autopsy held Dec. 17, 1913. The high radium content of the liver and other organs shows radium was still being fairly rapidly eliminated from the system.

II. Diagnosis, occupational poisoning, watch dial painter. Died Sept. 12, 1922. Body exhumed and autopsy held Oct. 15, 1927.

III. Diagnosis, poisoning from drinking radium water nostrum over a period of 5 years.



their radium by: (I) intravenous injection,<sup>12</sup> (II) dial painting,<sup>30</sup> (III) drinking radium water nostrums.<sup>5</sup> The original data have been recomputed and are presented in Table I in a form which shows the *relative concentration* of radium in the various bones and organs before ashing them for analysis. For reference purposes the concentration of radium in the vertebrae, measured in grams radium per gram of bone, is taken as 100.

## SUMMARY

Radium poisoning results when a few micrograms of radium or other alpha ray emitting solid radioactive substance become fixed in the system. Its action is principally to destroy the blood producing centers, and to weaken the bones. Calcium therapy, following Aub's and Flinn's work seems the only hope of removing radium from a victim's system. Modes of entrance of radium include the ingestion or breathing of radioactive substances by watch dial painters, chemists and miners, drinking radium water nostrums, and intravenous or other injections of radium by physicians.

From 60 to 98 per cent of the radium taken into the system is eliminated, principally in the feces (90 per cent) and urine (10 per cent). Some radon is lost in the expired air; no radium is lost in perspiration. Necrosis of the jaw, osteogenic sarcoma, and regenerative anemia are among the most common symptoms of radium poisoning. At least 6 unambiguous physical laboratory tests are available for identifying radium poisoning.

## REFERENCES

1. Leake, J. P., Radium poisoning. *J.A.M.A.* 98: 1077, 1932.
2. U. S. Bureau of Labor Statistics. *Month. Labor Rev.* 28:1200 (June), 1929; *ibid* (May), 1926.
3. Foreign Letters. *J.A.M.A.* 85:1571 (Nov. 14), 1925.
4. Bureau of Investigation. *J.A.M.A.* 98:1397, 1932.
5. Gettler, A. O. and Norris, C., Poisoning from drinking radium water. *J.A.M.A.* 100, 400 (Feb. 11), 1933.
6. Hoffman, F. L., Radium (mesothorium) necrosis. *J.A.M.A.* 85, 1:961, 1925.
7. Martland, H. S., Conlon, P. and Knaf, J. P., Some unrecognized dangers in the use and handling of radioactive substances. *J.A.M.A.* 85:1769, 1925.
8. Pack, G. T. and Stewart, F. W., Uranium-thorium colloid in the treatment of carcinoma. *J. Cancer Res.* 14:152, 1930.
9. Spies, J. W., Biological effects of radioactive substances. *Am. J. Cancer* 15:2173, 1931; *ibid* 15: 2182, 1931.
10. Flinn, F. B., Queries & Minor Notes. *J.A.M.A.* 98:2306, 1932.
11. Editorial. *J.A.M.A.* 93:771, 1929.
12. Cameron, W. H. and Viol, G. H., Classification of the various methods employed in the internal administration of radium emanation and radium salts. *Radium* 4:57, 1915.
13. Meyer, S. and Schweidler, E. v. *Radioaktivität*, 1927, p. 413.
14. Seil, H. A., Viol, C. H. and Gordon, M. A., Elimination of soluble radium salts taken intravenously and per os. *Radium* 5:40, 1915; also *New York M. J.* 101:896, 1915.
15. Mache, H. and Suess, E., *Wien. Ber.* 121:171, 1912.
16. Ramsauer, C. and Holthusen, H. *Heidelberg Ber.* Nr. 2, 1913.
17. Schlundt, H. and Failla, G., Detection and estimation of radium in living persons. III, The normal elimination of radium. *Am. J. Roentgenol.* 26:265, 1931.
18. Ketron, L. W., *vide* footnote, p. 41 of ref. 14.
19. Schlundt, H., Barker, H. H. and Flinn, F. B., Detection and estimation of radium and mesothorium in living persons, I. *Am. J. Roentgenol.* 21:345, 1929.
20. Hunter, D. and Aub, J. C., Lead studies. *Quart. J. Med.* 20:123, 1927.
21. Flinn, F. B., and Seidlin, S. M., Parathormone in the treatment of radium poisoning. *Johns Hopkins Hosp. Bull.* 46:269, 1929.
22. Flinn, F. B., Elimination of radium salts from the human body. *J.A.M.A.* 96:1763, 1931.
23. Blum, T., Osteomyelitis of the mandible and maxilla. *Am. Dental Assn.*, Sept., 1924, see *Month. Labor Rev.*, June, 1929, p. 1222.
24. Martland, H. S., The occurrence of malignancy in radioactive persons. *Am. J. Cancer*, 15:2435, 1931.
25. Martland, H. S., Occupational poisoning in manufacture of luminous watch dials. *J.A.M.A.* 92: 466, 552, 1929.
26. Martland, H. S., Microscopic changes of certain anemias due to radioactivity. *Arch. Path. & Lab. Med.* 2:465, 1926.
27. Reitter, G. S. and Martland, H. S., Leucopenic anemia of the regenerative type due to exposure to radium and mesothorium. *Am. J. Roentgenol.* 16: 161, 1926.
28. Martland, H. S. and Humphries, R. E., Osteogenic sarcoma in dial painters using luminous paint. *Arch. Path.* 7:406, 1929.
29. Evans, R. D., Technique for the determination of the radioactive content of liquids. *Rev. Sci. Inst.* 4:216, 1933.
30. St. George, A. V., Gettler, A. O. and Muller, R. H., Radioactive substances in a body five years after death. *Arch. Path.* 7:397, 1929.
31. Schlundt, H., Fulton, R. G. and Bruner, F., Radium-water generators. *J. Chem. Education* 10: 185, 1933.
32. Thomas, H. E. and Bruner, F. H., Chronic radium poisoning in rats. *Am. J. Roentgenol.* 29: 641, 1933.

# Mechanism of Infection in Poliomyelitis\*

HAROLD K. FABER, M.D.

*Department of Pediatrics, Stanford University School of Medicine,  
San Francisco, Calif.*

POLIOMYELITIS occupies a place of peculiar prominence among the acute infectious diseases which as medical men interested in the problems of public health and preventive medicine it is our task to control—for not only does it strike a special terror into the hearts of all parents but the recurrent epidemic waves appear to be rising higher and higher. We in California shall not soon forget the year 1930 when over a period of 7 months this plague spread from one end of the state to the other probably but little affected by our attempts at prevention or control.

There are not only many serious gaps in our understanding of epidemic poliomyelitis, but, I believe, some serious and widely accepted misconceptions as to the nature of the infection itself, particularly of the manner in which it enters the body, multiplies, invades and traverses the tissues and eventually produces its characteristic effects. Such faults must necessarily interfere with that clearness of thinking which is fundamental to any proper program of prevention, control and treatment.

Some of the questions that remain to be answered and that I wish to discuss are:

1. How is the virus of poliomyelitis conveyed to the human subject?
2. Exactly where is the anatomical site on

\*Read before the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, Calif., May 30, 1933.

which, when deposited, it can effect an entrance to the interior of the body so as to "take"?

3. What channels does it follow—the blood, the lymph, the lymphoid structures, the nerves—in passing through the body to reach the ultimate goal where ordinarily it exerts its peculiarly disastrous effects—the anterior horns of the spinal cord?

4. Why in some cases does the disease fail to cause paralysis, and can such cases—presumptively as dangerous epidemiologically as those with paralysis—be detected, or are their symptoms frequently indistinguishable from those of other infections?

5. In what ways may we hope to improve the chance of effective control by prophylaxis and specific treatment?

1. That the virus of poliomyelitis is frequently and perhaps most commonly conveyed directly from one person who harbors it in the nasopharynx to another is a generally accepted belief which it is not necessary to question. That this is the only, or the only important, mode of convection there is some reason to doubt. Leaving aside such rare modes of transportation as milk, it seems clear that the simultaneous outbreaks of cases over widely scattered areas without known immediate contacts, the peculiar seasonal incidence during the warm and dusty months, the known resistance of the virus to drying and the probable portal of entry through the nose, all suggest a possibility of air convection in dust that deserves further investigation. This is a problem that has received much less consideration and direct study than it merits, although Neustadter and Thro,

in 1911, showed the presence of virus in the sweepings from a sick room. Dust transmission, while as yet unproved, might explain some obscure features in the epidemiology of poliomyelitis, and it is desirable that future research be devoted to the problem.

2. It is reasonably certain that the anatomical site of implantation and initial infection in poliomyelitis is the nasal mucosa, not the lower respiratory or the gastrointestinal tracts. Time is lacking to review all the evidence on this point, but it may be noted that: (a) the nasal mucosa is the only portion of the body surfaces where poliomyelitic infection can be produced with regularity and without trauma (Flexner has long upheld this view and recently Schultz and Gebhardt have reported "takes" in 43 out of 46 monkeys so treated); (b) other surfaces, such as the gastrointestinal, have been shown to be impermeable to the virus; (c) infection is accomplished with the utmost difficulty by way of the blood stream, only succeeding when enormous amounts of virus are introduced and only after a significantly delayed incubation period; (d) active virus has been detected on the nasal mucosa in patients with the disease, in carriers, and in 1 instance in a person who 5 days later came down with the disease.

The site of entry can be even more sharply delimited. It is obvious that the virus has a particular adaptation to nervous tissue and it is well established in experimental work that bringing virus into direct contact with nervous tissue is the only method reasonably certain to produce infection.

While the central nervous system is embryologically ectodermal there is only one situation in the mature vertebrate organism where it remains exposed on the very surface of the body and this is the so-called olfactory epithelium. Since this is probably the

area through which poliomyelitic virus enters the body, it may be noted that in the adult it is located high in the nose, in the superior meatus and the corresponding portion of the nasal septum, beyond the point reached by the air currents during quiet respiration, but that in the child it is relatively much nearer the external openings of the nostrils, a point that may have some bearing on the age incidence of poliomyelitis. By forcible inspiration and sniffing air is drawn directly over this area and material contained in the air deposited on the surface. Normally, most of the surfaces of the nose, especially in the middle and superior meatuses, are overlaid by mucus which moves downward and backward toward the nasopharynx under the influences of ciliary action, traction by swallowing, etc. The presence of the mucus and its movements are of the utmost protective importance in catching and removing particles of sputum and dust that may be inspired before they can reach and infect the mucus membranes themselves. The structure of the olfactory membrane renders it, moreover, particularly vulnerable to attack by a virus capable of infecting it, once this virus has been carried to its surface. The processes, the olfactory hairs, of the olfactory cells are by no means all embedded in the surface mucus but a large proportion of them actually lies free on the surface, directly exposed to the air—an arrangement essential to the sense of smell in all air-breathing vertebrates. Particulate matter carried by the air will then be deposited directly upon the long terminal processes of the olfactory cells, and if later embedded in the mucus will come in contact with the shorter olfactory hairs.

The possibility of exposure outlined takes on a particular importance when considered in relation with the known neurotropic properties of poliomyelitic

virus because the olfactory cells in the nasal epithelium, of which the olfactory hairs are essential parts, are in fact nerve cells connected by their axons directly with the central nervous system. The only direct communication between the nasal surface and the olfactory bulb is through the axons, or axis cylinders. Perineural lymphatics are probably not in immediate connection with the central nervous system but, if they do exist, communicate with the subarachnoid space, not with the bulb itself. There are no direct vascular connections between nasal mucosa and the central nervous system proper, and since the olfactory nerves are unmyelinated there is no communication even through myelin sheaths. These points, as well as others to be mentioned later, are of particular importance in relation to the experiments of Fairbrother and Hurst and of Hurst, which demonstrated a fundamental principle of poliomyelitic infection; namely, that the virus is propagated along and through the axons of the nervous system. The normal anatomy of the olfactory mucosa and nerves, therefore, is seen to offer a direct channel for a virus with the known properties of that of poliomyelitis, to ascend directly from the surface into the very substance of the central nervous system.

Can such ascent in fact be demonstrated? In 1912 Flexner and Clark swabbed the surface of the nasal mucosa in a monkey with a suspension of poliomyelitis virus; 48 hours later, they killed the animal and found virus present in the olfactory bulb but not—and this is important—in either the medulla or the spinal cord. They drew the justified conclusion that the virus had ascended through or along the olfactory nerves to the bulb and had not spread through the blood or cerebrospinal fluid, else the more susceptible medulla and spinal cord would have become simultaneously infected. By reason of

technical difficulties this experiment appears not to have been repeated. Recently, however, with Gebhardt's assistance, I was able to confirm and amplify the result. On the fourth day of incubation, when virus was first demonstrated in the central nervous system, it was strictly limited to the olfactory bulb and was not found in the brain stem, cerebral cortex, pons, medulla, spinal cord or dorsal ganglia. In the olfactory bulb, however, it was present in a very high concentration. It seems fair to conclude that *the olfactory bulb is the initial focus within the central nervous system of poliomyelitic infection.*

3. The next question is what pathways the virus follows in reaching out toward the spinal cord where it produces its most characteristic end effects. Is it through the blood stream, through the cerebrospinal fluid, or through the substance of the nervous tissues? If through the blood stream we should during the ensuing days of the incubation period find the virus evenly distributed through the central nervous system, or at least through the highly susceptible medulla and spinal cord. If through cerebrospinal fluid the spread should be similarly diffuse and rapid, since the circulation of this fluid to all levels of the central nervous system is rapid, as shown by familiar experience with dyes, and infectious material introduced into the cerebral subarachnoid spaces would reach the spinal spaces within a few minutes. If spread is through the axons it should be much slower and virus should be found successively, during the incubation period, in the central ganglia, medulla and cord, since it is by these paths that the outgoing tracts of the olfactory system connect with other portions of the central nervous system. The localizations of virus on the fifth, sixth and seventh days, as determined in our experiments, did, in fact,

correspond closely with the axonal route postulated, and no virus was found in the spinal cord until the seventh day. Moreover, no virus was found even in the cerebellum, on only one occasion in the cerebral cortex and then, on the seventh day, in the olfactory region of Ammon's horn. The experiments, then, show that virus is propagated along the axons rather than in the cerebrospinal fluid (as had been shown by Fairbrother and Hurst) and, in the laboratory animal at least, along a particular route through the olfactory nerves, bulb and tracts and thence through connecting tracts to the medulla and cord, avoiding the cerebral cortex and cerebellum.

What reasons are there to believe that the same route of propagation holds true for human infection? First, the portal of entry appears to be the same. Second, as shown by various pathologists (Harbitz and Scheel, Müller, Wickman and others) the distribution of lesions in the brain and brain stem closely corresponds with the route described—an abundance of lesions in the central ganglia, midbrain, medulla, with few, slight or no lesions in the cerebral cortex and cerebellum. Third, the early symptomatology of the disease, as was suggested many years ago by Redlich, is strongly suggestive of a central nervous origin. Moreover, a careful analysis of the onset and later paralytic symptoms which I have recently made, shows that the very first manifestations of poliomyelitis may well originate in the upper portions of the brain stem which are directly connected with the olfactory tracts, while the subsequent signs and symptoms apparently originate in the medulla, posterior horns of the cord and dorsal ganglia with final implication of the anterior horns. Thus, the clinical manifestations not only harmonize with the animal experiments as evidence of spread of the disease solely within the central nervous

system, but supplement them by showing the pathways followed by the infection within the spinal cord itself.

4. The non-paralytic, so-called abortive type, of poliomyelitis is of much theoretical interest and even greater practical importance, especially to the epidemiologist and clinician. This type of case is explained by the failure of the virus to complete its journey to the anterior horn cells of the cord or to die out before it has lethally infected them. Since this occurrence is but rarely noted in monkeys the experimental study of the subject is difficult, though the tendency for the virus to die out in areas of the brain previously infected has been noted by Fairbrother and Hurst, and was also evident in our experiments of the 7th day. From a practical standpoint, interest focusses on the frequency of abortive cases in man and the possibility of detecting them with regularity and reasonable certainty, particularly because it may be supposed that such relatively mild cases afford, especially if ambulant, means for the spread of contagion. The frequency of such cases has by some been estimated as high as 10 to 1 in relation to those with frank paralysis, and it has often been thought that during or preceding epidemics many very mild illnesses, characterized by slight fever, mild respiratory or gastrointestinal disturbances, and presenting no pathognomonic features of poliomyelitis are in fact mild and unrecognizable forms of that disease. This conception, which during epidemics has led to a considerable amount of apprehension and hysteria in the minds of the lay public, has no very convincing factual basis. Though varying considerably in different epidemics, the ratio of non-paralytic to paralytic cases is probably on the average not more than 2 or 3 to 1. More important, it is now exceptional for cases of poliomyelitis to fail of diagnosis. The

increased familiarity of the medical profession with the disease and its alertness for early diagnosis are responsible for this. The studies of Aycock and his associates in Massachusetts showed few missed cases, and that minor infections occurring during an epidemic period of poliomyelitis could not be shown to have been mild poliomyelitis by subsequent tests for immunity. It is only in very exceptional cases, non-paralytic as well as paralytic, that the first lumbar puncture fails to reveal characteristic changes. Moreover, it is becoming increasingly clear that the early clinical picture of poliomyelitis is characteristic, generally recognizable and essentially identical in the cases that go on to paralysis and in those that end without it.

The very existence of abortive cases and their occurrence in considerable numbers point to a fact that is little appreciated; namely, that the virus of poliomyelitis is, on the whole, rather poorly adapted to survival in man, or, to put it another way, that the great majority of human beings possess very considerable powers of defense against it.

The course of the disease even in patients who have some residual paralysis supplies further evidence of this fact, since in the average case only a few restricted areas of motor cells in the cord or medulla are destroyed and the rest are either unaffected at all, or, if affected during the acute phases of the disease, recover their function completely, as shown by diminution of the extent of paralysis; moreover complete recovery of the sensory cells, almost always involved early in the disease, is practically uniform when the patient survives. The fact that about 80 per cent of urban adults possess specific immune serum antibodies against poliomyelitis must indicate that they at one time harbored the virus and resisted its effects.

5. This obvious fact of poor adaptability of the virus to human tissue or of effective defense against its attack offers at the same time a basis for some optimism in regard to the possibilities of prevention, if not of treatment. If the virus tends in the average case to die out quickly, cannot this tendency be increased by artificial means before or during the actual attack? The hopes and disappointments of serum therapy in poliomyelitis are familiar to all. At present there is widespread pessimism over the value of convalescent serum, based in part on the results of experimental work and in part on clinical observation. In the monkey, it is apparently impossible to prevent the disease from developing or even to modify its course by the administration of immune serum very long after inoculation of virus into the brain or even on the nasal mucosa. It is, however, only fair to point out that poliomyelitis is a much more severe infection as a rule in the monkey than in man, leading almost regularly to complete paralysis and death; whereas in man the average mortality is only 15-20 per cent; not over half of the total cases show residual paralysis and in the majority of these a relatively small proportion of the total muscle mass is involved. It might be expected *a priori* that the administration of serum would still further lessen the incidence and extent of paralysis in treated patients and this was apparently shown by the studies of Aycock and Kramer in the Massachusetts epidemic of 1929, and by Amoss in a subsequent study. More recently Kramer and his associates, and Park and his associates, have cast serious doubt on the occurrence of any beneficial results from serum, by their clinical comparisons of treated and untreated cases in the same locality and period of time. Nevertheless, I believe that judgment may be suspended until further trials have been made. My

reasons for this are that the sera generally used have been of unknown, and probably in many cases, defective strength in respect to the concentration of antibodies, and that the amounts used and the methods of administration may often have been seriously inadequate. The convalescent from poliomyelitis does not necessarily show a high degree of specific immunity in his serum; in fact, there is reason to believe that it is not infrequently low and that, in some instances, he originally acquired the disease because of an inherent inability to form antibodies in normal amounts. Individuals who have never had manifest poliomyelitis may have much higher concentrations of immune substances in their serum. The situation might be compared with that in the treatment of diphtheria if the only antitoxin used had been of untested, unknown titer, employed in inadequate amounts. In poliomyelitis it is possible to make a more convincing test of therapeutic value than has hitherto been developed, by using as donors only those individuals—preferably adults—who, irrespective of previous poliomyelitis, are known by specific test to have highly immune blood, thus overcoming the restrictions of serum supply that are incidental to the exclusive use of convalescents, most of whom are young children. A perhaps more promising source of really potent serum has been made available by the discovery that some horses and other animals can be immunized to a very high degree—much higher than any observed in man—and so provide therapeutic serum in large amounts. The value of really intensive therapy still remains quite problematical. Park assumes that once the virus has lodged within the nerve cell it is inaccessible to the circulating antibodies. This is probably correct but I have elsewhere pointed out that for poliomyelitic infection to run its full course to lower

motor neuron paralysis it is necessary for virus to escape from an infected cell, to traverse the synaptic space between it and the next neuron and in this space to be exposed to the interstitial fluids, which presumably contain immune substances derived from the blood stream. For this theoretical reason, a thoroughgoing trial of really intensive serum therapy is worth making.

The chances of effective prophylaxis in poliomyelitis are in some respects at least hopeful. It is true that no safe or certain method of active immunization, even in the experimental animal, has as yet been developed, despite long continued, energetic and extensive study by many investigators. Nevertheless, the results of some of the virus modifications and of intracutaneous inoculation afford a basis for encouraging further study. The curious fact that subinfective inoculations into nerve tissue give no immunity suggests that immunity, or at least the production of immune virucidal substances in the serum, is the result of an extranevous reaction to the virus rather than of actual, subclinical infection. If this be true, the prospect of eventually developing a safe and effective method of active immunization appears to be distinctly hopeful. While active immunization is at present a hope rather than a reality, passive immunization as a means of preventing infection during epidemics appears to be already of practical, if limited, importance. It is known from experiment, that animals can be protected for a time from the effects of virus inoculation by the preliminary or simultaneous injection of immune serum, and in human beings it appears to be well authenticated that passive protection to another virus disease, measles, is practicable. Even though passive protection from the injection of immune serum in general appears to last only a few weeks, such protection is decidedly worthwhile. The use of

convalescent or normal serum (from parents or others) for this purpose has been carried out on a fairly large scale in Pennsylvania, in the epidemic of poliomyelitis, 1932, with apparently beneficial results, and I believe that we are no longer justified in reserving immune serum for exclusive use in treatment of patients who have already developed the disease. Here again, I strongly urge the use of tested serum, known to contain virucidal substances in substantial concentrations. This will require organization and financial support in advance of epidemics, since, for passive immunization, human serum is decidedly preferable to that of horses or other animals in order to minimize sensitization. It is perfectly feasible to test potential donors in sufficient numbers to provide an adequate supply of high grade human serum for any given community, since it has been

shown that about 80 per cent of normal adults have specific immune substances in their blood, and of these a very considerable percentage have them in reasonably large amounts. This is a matter which state and municipal boards of health should look into with a view to obtaining adequate appropriations. There is no disease over which the public is more apprehensive and in which both the laity and medical profession feel more helpless, and I believe that an effort to supply any promising method of defense would meet with prompt public support.

NOTE: References, here omitted, as well as the analysis of symptoms and other matter referred to in this paper will be found in a review by the author that appeared in *Medicine*, May, 1933. The experiments by Faber and Gebhardt are reported in detail in the *Journal of Experimental Medicine*, June, 1933.

---

## Destruction of the Vitamins by Pasteurization

THE only vitamin which has been shown to be destroyed by pasteurization is vitamin C, and the destruction is only partial. The only disease due to a vitamin deficiency, which has been shown to be associated with the use of pasteurized milk, is infantile scurvy. This disease results from a deficiency of vitamin C, and in some of the cases reported the cause was traced to the use of milk which had been pasteurized more than once. However, even on complete diets of efficiently pasteurized milk, the danger of mild scurvy must be considered to exist, and diets for children should always be supplemented by other sources of the anti-scorbutic agent, e.g., orange juice. This practice is wide-spread today, but it is not gen-

erally recognized that any ordinary bulk milks, whether raw or pasteurized, represent comparatively poor and variable sources, not only of vitamin C, but of certain other vitamins. Under these circumstances there is considerable force in the argument that dependence on complete milk diets as efficient vitamin sources should be discontinued. The merit of including raw milk in the diet of young children for the prevention or arrest of dental caries has been demonstrated, but the contention that pasteurized milk is not an efficient agent has been shown to be unproven.—The Nutritive Properties of Milk in Relation to Pasteurisation. J. D. Stirling and J. H. Blackwood. Hannah Dairy Research Institute, *Bull.* 5, p. 71.



# Natural and Induced Variations in the Vitamin Values of Milk\*

H. C. SHERMAN

*Department of Chemistry, Columbia University, New York, N. Y.*

THE mammals which man has domesticated, and whose milk is now largely diverted to purposes of human nutrition, have doubtless played a large part in so nourishing the human family as to permit of its evolving a type of life-cycle which provides liberally for mental and social development.

Doubtless what some evolutionists have called the "prolongation of infancy"—perhaps more clearly expressed as an extension of the learning period to occupy a larger part of the life-cycle of the individual member of the race—has probably been largely dependent upon the use of milk in human nutrition to a greater extent than was or is possible through human milk alone.

Thus there is a very far reaching significance in our employment of cows' milk as human food, and in the questions: How constant is this food in the various aspects of its nutritive value? How far have the different factors of nutritive value in milk been stabilized by evolution? How far can we control or improve them through our treatment of the cow which produces the milk or of the milk itself after its production?

These are large and somewhat complex questions. The need for brevity in this paper makes it seem wiser to treat them in somewhat general (even if sketchy) terms, in the hope of making

clear the main principles involved, rather than to attempt a technical analysis of the experimental details with citations of original publications.

## VITAMIN A

McCollum and Simmonds early showed that the vitamin A value of milk depends ultimately upon that of the food which the lactating female has received. That the vitamin A content of milk may be raised by the feeding of cod liver oil, kale, or fresh pasture has been shown by Drummond, Coward, and Watson; Kennedy and Dutcher; Golding and Luce; and Golding, Soames, and Zilva. On the other hand Fraps and his coworkers have shown that a cow previously well fed may supply vitamin A to her milk from her bodily store to such an extent that the fat of her milk continues to be of normal vitamin A value during many months of subsistence on a diet poor in vitamin A. MacLeod, Brodie, and Maclooin found that milk produced under good and substantially uniform conditions of stall feeding was of practically the same high vitamin A value throughout the year. The Nebraska Agricultural Experiment Station reports that the vitamin A values of the milks of different breeds of cows do not differ as do the percentages of fat in these milks.

Undoubtedly the vitamin A of the mother's milk has important survival value for the species. This fact and such experimental findings as have just been briefly noted both support the view that evolution has in some measure

\* To be read at a Joint Session of the International Association of Dairy and Milk Inspectors and the Food and Nutrition Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1935.

stabilized the vitamin A content of milk, and that it has further provided for the maintenance of relative constancy in this regard by the development of the body's capacity to store vitamin A in relatively large amounts in times of abundant intake and to furnish vitamin A to the milk from this store during periods when the intake is low.

In view of the great importance of vitamin A for growth and healthy development, it is natural to find that the mammalian species have evolved the capacity to transfer rich stores of this vitamin to the milk whose sole function in nature is to serve as nutriment. And as cattle are furnished with a digestive apparatus which permits them to consume grasses and other leafy foods in very large amounts, and they have been bred to high efficiency and capacity in milk production, the milch-cow performs a most important service in bringing into form favorable to human consumption and utilization liberal supplies of vitamin or pro-vitamin A which have been formed in the green leaves of plants.

This fact, and the stabilizing influence of the factor of body storage, and the further fact that the rations which are economically profitable for the dairy farmer to feed are almost always of fairly high vitamin A value—all combine to bring about the result that under present-day conditions of actual practice the vitamin A value of ordinary mixed whole market milk is fairly uniform so that milk is both a highly important and a highly reliable source of vitamin A.

#### VITAMIN B

Recent research by Steenbock and his coworkers indicates that the vitamin B content of milk is "under physiological control" in the sense that it cannot readily be raised above a normal value by the feeding of more vitamin to the

cow; and also in the sense that when this factor in the milk has been artificially lowered by the feeding of rations very poor in vitamin B, the normal vitamin B value of the milk is quickly regained as soon as the cow is again normally fed.

Here, as in the case of vitamin A, the rations which are found profitable in modern milk farming are sufficiently rich in the vitamin to make it fairly certain that milk made on such rations will predominate in the mixed milk which appears in the market under present-day conditions.

The striking results obtained at the Pennsylvania Agricultural Experiment Station show also that the digestive tract of the cow furnishes a favorable environment for certain vitamin-B-producing bacteria, so that a cow may continue to produce milk of normal vitamin B value even when her food is rendered abnormally poor in this vitamin for a long experimental period.

Thus, while milk is not an outstandingly rich source of vitamin B, it now appears to be a more constant and reliable source than has hitherto been appreciated.

#### VITAMIN C

What has just been said of vitamin B, is true also of vitamin C: milk is not a rich source of this vitamin, but is a more reliable source than is generally understood. Also milk and potatoes are typical of the foods which while having only relatively low concentrations of vitamin C are yet important sources of this vitamin because of the relatively large amounts in which these foods are consumed in an ordinarily well balanced American or European dietary.

Several years ago it was shown by the work of the Minnesota and Wisconsin Agricultural Experiment Stations and by that of Dr. Hess of New York City that the vitamin C value of milk

can be decidedly influenced by the feeding of the cow. These experiments were of fundamental importance but may have given rise to exaggerated impressions. Seeking clear-cut and conclusive results, the experimenters made use of rations differing more radically than is common in actual practice, and correspondingly they found larger differences in the vitamin C values of the milks produced than are apt to be found among the milks that ordinarily come to market.

Repeated tests at the Kansas Agricultural Experiment Station indicated a better maintenance of the vitamin C value of the milk even when cows were kept for long periods on vitamin-C-poor food. Whether there is a possibility of synthesis of vitamin C by bacteria in the digestive tract of the cow, as noted above in relation to vitamin B, remains to be determined.

MacLeod found that with good feeding such as modern dairy farmers already use in the interest of high milk production, the milk as sent to market by a large dairy farm in New Jersey was of practically constant vitamin C value throughout the year, and that this value is about 50 per cent higher than the estimates current in the literature would indicate.

Thus while there have undoubtedly been valid demonstrations of wide variations of vitamin C values of milk as induced by experimental feeding, the present evidence indicates strongly that such differences need not occur at any season of the year under the ordinary conditions of dairy farming, and need not be anticipated in the mixed market milk ordinarily delivered to consumers under present-day conditions.

#### VITAMIN D

Hitherto, the methods generally used in testing for vitamin D values have involved the employment of experimental diets of such drastically rickets-

producing character that only relatively high antirachitic potencies could be demonstrated. With the use of more delicate or of more searching methods, it is now being found that several foods including milk are more important sources of vitamin D than previous work had indicated or than would be inferred from the statements still current in the literature.

However, in northern latitudes and in cities where the antirachitic value of sunlight is greatly diminished by smokiness of the atmosphere, it is to the advantage of the human infant (and perhaps of older humans as well) to receive more vitamin D than cows' milk as hitherto commonly produced can be depended upon to supply—hence the present interest in methods for the enrichment of the vitamin D value of milk.

A large amount of evidence now consistently indicates that this idea is scientifically and economically sound, and so distinctly to the advantage of the public health as to be worthy of encouragement and practical extension even during the period in which some of the methods of official control still remain to be developed.

Three different methods of enrichment of milk in vitamin D—(1) the direct addition of a vitamin D concentrate, (2) the irradiation of the milk, and (3) the feeding of irradiated yeast or other suitable irradiated material to the cow—have all been shown to be practicable and effective. As all of these methods were ably discussed in papers presented at the Washington meeting, it is not necessary to discuss them further here. All seem certainly to be meritorious; their relative merits will doubtless become clearer with further investigation and experience.

The fourth method which naturally suggests itself, namely, the irradiation of the cow, has thus far yielded rather conflicting evidence. Among the most

recent findings, those of Mitchell, Eiman, Whipple, and Stokes (reported at the Washington meeting and published in the *Journal* of December, 1932) seem on the whole to be encouraging.

Hence those who desire to secure and insure the enrichment of milk in vitamin D have a choice, certainly of three and perhaps of four, practicable methods. Even though this situation presents problems as to methods of official regulation, it is highly gratifying as an advance in the practical campaign for the eradication of rickets, and for insuring the public a milk supply of high and well balanced vitamin value.

#### VITAMIN E

For two reasons this paper does not attempt to summarize the case for vitamin E in parallel fashion with that of the other better known vitamins: (1) there seems to be no convincing evidence as yet that vitamin E is a practical factor in human health; and (2) methods for the quantitative measurement of the vitamin E values of foods have not been developed and standardized to the same degree as in corresponding work with the other vitamins here considered.

#### VITAMIN G

The differentiation of vitamin G ( $B_2$ ) from vitamin B ( $B_1$ ) is so recent, and the methods for the measurement of vitamin G values have even yet been adequately controlled in so few laboratories, that the extent and causes of variation of the vitamin G value of milk are probably best regarded as problems still awaiting precise quantitative development.

We have, however, considerable evidence that milk as ordinarily produced is a rich and reliable source of vitamin G at all seasons of the year. It is to be hoped that means can soon be found for such further quantitative research

in this field as is needed to give greater precision and positiveness to our knowledge, for vitamin G is undoubtedly very important to public health and individual efficiency.

#### SUMMARY

While the vitamins differ too much among themselves, in chemical nature and in nutritional function, to permit of much generalization, the chief principles involved in the facts above summarized may be briefly recapitulated as follows:

1. The animal organism is not to be expected to synthesize vitamins *de novo* in the same sense that it synthesizes enzymes and hormones. In general, either the vitamin or its precursor must be furnished by the food or some other factor of the environment, such as symbiotic bacterial action in the case of vitamin B or irradiation in the case of vitamin D, must be provided.
2. The fact that the ordinary environment of the cow does provide such factors makes the vitamin values of market milk somewhat less dependent upon the vitamin values of the food of the cow in actual practice than has appeared to be the case in those researches in which artificially drastic conditions were set up and maintained for experimental purposes. In the case of vitamin A bodily storage also serves to regulate the vitamin value of the milk.
3. A further regulator of the vitamin value of milk as practically produced for market is found in the fact that the rations which are profitable for the dairy farmer to feed are not at any time of the year apt to be vitamin-poor; and if vitamin-poor rations are occasionally fed they do not produce a large enough amount of milk to influence seriously the nutritional character of the mixed milk which comes to market under the present-day conditions and methods of the milk industry.
4. In the one case in which this is less true than in the others, and in which therefore there is special reason for the fortification of the milk, namely with vitamin D, there are certainly three and perhaps four different practicable methods by which the desired enrichment may be accomplished.
5. In the vitamin G value of milk we have a recently discovered factor, of much importance in nutrition and food values, the precise evaluation of which must await further and more far reaching research.

# Toxic Amblyopia and Accompanying Physiological Disturbances in Carbon Tetrachloride Intoxication\*

ZOLTON T. WIRTSCHAFTER, M.D.  
*Cleveland, Ohio*

**T**OXIC amblyopia is an ocular condition, characterized by dimness of vision and an alteration of the color fields, the etiological factor being, in most cases, a substance of exogenous origin.

In his discussion of toxic amblyopia due to carbon bisulphide intoxication, Knapp<sup>1</sup> states:

... the patients complain of seeing through a cloud; there is the characteristic central disturbance of vision with a comparatively free periphery of the field and the loss of color perception in the center. The condition is usually bilateral and all the reports agree on the presence of the central defect with normal periphery of the field, characteristic for toxic amblyopia in general.

In the present study of toxic amblyopia due to carbon tetrachloride poisoning, perimetric examination revealed no central defect but a marked constriction of the periphery of the visual color fields. The subjective symptom of dimness of vision, however, was the same as in the usual toxic amblyopia as typified by carbon bisulphide poisoning.

## OBSERVATION OF CASES

Five adult male workers from four establishments in the dry cleaning industry were examined. All of these men were exposed to carbon tetra-

chloride vapor from 8 to 10 hours daily for periods varying from 1 to 6 months preceding examination.

*Case 1*—J. L., a white male, age 20, had been exposed for a period of 5 weeks previous to examination. He complained chiefly of severe frontal headache associated with vertigo, tinnitus, nausea and vomiting. He was unable to eat without subsequently vomiting most of the ingested food. These symptoms started within a few days after commencing this work. About 3 weeks after exposure began, he noticed a gradually increasing disturbance of vision, manifested by seeing "spots before the eyes." He also complained of a marked disturbance of the sense of taste, so that "even cigarettes tasted like bile." Physical examination revealed a well developed white male, weight 218 lb., appearing somewhat lethargic and stuporous. There was moderate pallor of his skin. The sclerae had a slight icteric tinge. The pupils were normal and reacted normally to light and accommodation. Heart and lungs were normal. Abdominal examination was normal. Reflexes were physiological. Blood sugar tolerance analyses were as follows:

	Blood Sugar	Urine Sugar
Fasting	87 mg.	Slight
30 Min.	154 mg.	None
1 Hr.	115 mg.	Trace
2 Hr.	99 mg.	None
3 Hr.	90 mg.	None

\* To be read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

*Case 2*—F. K., a white male, age 43, had been exposed to the carbon tetrachloride vapors for a period of 10 weeks previous to examination. Before the period of exposure he had been in good health. Since working at the dry cleaning plant, he had had continual nausea but did not vomit. The nausea was accompanied by marked dizziness, headache, and weakness. He suffered no pain of any kind. About 2 weeks after commencing work, his vision became blurred and his eyes felt greatly irritated. In addition to the above complaints, there was marked polyuria and constipation. Physical examination showed a well developed white male, weight 165 lb., appearing somewhat weak and lethargic. The conjunctivae were congested and there was marked epiphora. Heart was normal. They were a few moist râles at both lung bases. The abdomen was normal. Reflexes were normal. Blood sugar tolerance analyses were as follows:

	Blood Sugar	Urine Sugar
Fasting	90 mg.	Slight
30 Min.	169 mg.	Moderate
1 Hr.	150 mg.	Large Amt.
2 Hr.	84 mg.	Mod.
3 Hr.	61 mg.	Slight

*Case 3*—H. M., a white male, age 30, had been exposed for a period of 4 weeks previous to examination. During this period he had severe diarrhea with moderate abdominal pain. Two weeks after the onset of the exposure nausea and vomiting began. The vomiting occurred about 15 minutes after each meal, being most marked after the noonday meal. In the period after the onset of the gastric symptoms he lost 6 lb. in weight. He complained of increasing muscular weakness and lassitude. Physical examination revealed a well developed white male, weight 146 lb., appearing markedly irritable. There was marked skin palor. The conjunctivae were

congested and there was marked epiphora. Heart, lungs and abdomen were normal. There was slight exaggeration of the abdominal reflexes and also a slight tremor of the hands. Blood sugar tolerance analyses were as follows:

	Blood Sugar	Urine Sugar
Fasting	90 mg.	Slight
30 Min.	118 mg.	None
1 Hr.	95 mg.	Slight
2 Hr.	89 mg.	Slight
3 Hr.	80 mg.	Slight

*Case 4*—R. V., a white male, age 48, had been exposed for a period of 6 months before examination. He complained of severe dizziness, headache, nausea, and vomiting. The ocular symptoms in this case were more marked than in any of the others. He stated that everything looked smaller than previously; that he had black spots before his eyes continually. The dimness of vision became so marked that on several occasions while driving his automobile home from work, he had to stop for a few minutes until his vision cleared slightly before he could proceed further. At the time of examination he had ceased driving. Physical examination revealed a well developed white male, weight 207 lb. The skin showed slight pallor. The pupils reacted normally to light but more slowly to accommodation. Heart, lungs, and abdomen were normal. Reflexes were normal. Blood sugar tolerance analyses were as follows:

	Blood Sugar	Urine Sugar
Fasting	78 mg.	Slight
30 Min.	150 mg.	Moderate
1 Hr.	124 mg.	Large Amt.
2 Hr.	90 mg.	Slight
3 Hr.	74 Mg.	Slight

*Case 5*—I. H., a white male, age 44, had been exposed for 6 weeks before examination. He observed no symptoms until about 3 weeks after he began to work over the vats. He then began

to have nausea and headache but did not vomit until about 1 week later when the vomiting became very severe. At this time he was unable to retain any food in his stomach. The attacks of vomiting were accompanied by severe abdominal cramps. He also had attacks of diarrhea which varied in severity. He stated that for the past few nights he had been unable to sleep, although he felt sleepy and tired. During the period of exposure there had been a gradual but complete loss of sexual libido. During this period he lost 9 lb. in weight. Physical examination showed a well developed white male, weight 156 lb. The conjunctivae were congested and there was slight epiphora. Heart, lungs, abdomen and reflexes were normal. Blood sugar tolerance analyses were as follows:

	Blood Sugar	Urine Sugar
Fasting	96 mg.	None
30 Min.	124 mg.	Moderate
1 Hr.	116 mg.	Slight
2 Hr.	95 mg.	Slight
3 Hr.	90 mg.	Slight

Ophthalmoscopic examination in these cases did not reveal any abnormalities except a slight paleness of the disc. Toxic amblyopia being suspected, perimetric examinations of the five men were made. All of the men, including the two who had not suffered from visual disturbances, showed bilateral peripheral constriction of the color fields. No central scotomata were present in any of the perimetric charts. A B&L Stereo-Campimeter was employed in making all central field studies. Peripheral fields were checked up with a campigraph. Illumination in all cases and the size of the test object ( $1\frac{1}{2}^\circ$ ) were kept constant. A uniform procedure of examination was employed in all cases, targets being moved from non-visible to visible. Periodic observations in Case 1 illustrate the

progress of a typical case. With the removal of exposure, the subjective visual disturbances as well as the general complaints disappeared. At intervals of 7 to 10 days, perimetric examinations were repeated, and revealed a gradual expansion of all the color fields which were found to be within normal limits 5 weeks after cessation of exposure.

#### PATHOLOGICAL PHYSIOLOGY

The pathological physiology of the toxic amblyopia observed in carbon tetrachloride intoxication appears to be closely associated with disturbances in carbohydrate and fat metabolism. Lamson<sup>2</sup> states that "carbon tetrachloride produces a liver necrosis with an increase of guanidine or guanidine-like substances in the blood with a subsequent fall of blood sugar." In this group of cases, the men had blood glucose concentrations which were at the lower border of the normal variation and, in some cases, even below this. Moreover, slight amounts of sugar were found in the fasting urine specimens and larger amounts after the administration of glucose, especially in Case 2. The blood sugars, urines, and the visual fields returned to normal after the men left their work and were put on a high calcium and dextrose diet. This therapy has been used in carbon tetrachloride poisoning by many investigators including Minot and Cutler.<sup>3</sup>

Recently, Adler<sup>4</sup> has demonstrated that that portion of vitreous humor of the eye which is in close contact with the retina contains less sugar than the more anterior layers. This was shown to be due to the fact that the retina has a greater glycolytic power than any other tissue of the eye, *i.e.*, the low sugar content of the vitreous is a result of the rapid utilization of glucose by the adjacent retina. All sugar entering the vitreous must first pass through the

retinal circulation, where a portion of it is consumed. Adler further demonstrated that sugar could not pass into the vitreous from the aqueous humor. He suggests that "possibly the retina, not having storage facilities for glycogen, is forced to use the glucose circulating in the blood for its metabolic need."

A lipemia and a cholesterolemia have been shown to be present in carbon tetrachloride poisoning as a result of central necrosis and fatty degeneration of the liver. MacMahon and Weiss<sup>5</sup> report an autopsy in a case of severe carbon tetrachloride poisoning in which the blood in the pulmonary arteries contained 64 per cent fat and in the inferior vena cava 25 per cent. They state that the source of the fat was the liver which showed severe injury. Butsch<sup>6</sup> reports a non-fatal case of carbon tetrachloride intoxication in which the blood fat on admission was 1,245 mg. per 100 c.c. estimated as tripalmitin, but which dropped to 765 mg. 3 weeks later. The serum cholesterol in this case was 856 mg. per 100 c.c. on admission and 563 mg. after 3 weeks. The patient was back at work 1 month after admission to the hospital.

According to Adler,<sup>4</sup> "there is clinical evidence that some substance present in the liver and in certain fats is concerned with rod-visual purple function." The periphery of the retina consists chiefly of rods, and, moreover, the visual purple is most abundant in this area. The scotomata which occur as a result of disturbances of the outer layer of the retina, which includes the rod-visual purple mechanism, correspond in "position, shape and extent to the retinal lesion."

Whatever theoretical explanation these facts may have, it is suggested that (a) as a result of the low blood

sugar which is encountered in carbon tetrachloride intoxication, the retina is deprived of an adequate source of glucose, a constant supply of which is essential to the normal metabolism and function of the retina; (b) that another factor in the visual disturbance may be an alteration of the rod-visual purple mechanism of the periphery associated with the deranged fat metabolism.

Although the constitutional symptoms in the present series of cases were not especially severe, the constriction of the color fields was marked even in the mildest case. It is of utmost significance that carbon tetrachloride intoxication can be detected at an early stage by routine perimetric examination of exposed workers. It is probable that similar phenomena may be discovered by the same method in intoxications caused by other fat solvents, such as chloroform or benzol.

#### CONCLUSIONS

1. Toxic amblyopia may result from exposure to carbon tetrachloride vapor.
2. The resulting amblyopia is characterized by concentric constrictions of all the color fields without central scotomata.
3. The resulting amblyopia differs from the usual toxic amblyopia, of which that due to carbon bisulphide is typical, in that the color fields in the latter are marked by central scotomata with a normal periphery.
4. With cessation of exposure, and a high calcium and dextrose diet, the amblyopia rapidly disappears.
5. Routine examination of the visual fields of workers exposed to the vapor of carbon tetrachloride is suggested to detect intoxication at an early stage.

#### BIBLIOGRAPHY

1. Knapp, A. *Medical Ophthalmology*, Blakiston, Philadelphia, 1918, p. 221.
2. Lamson, P. *J.A.M.A.*, 92:1206 (Apr. 6), 1929.
3. Minot, A. S. and Cutler, J. T. *J. Clin. Invest.*, 6:369 (Dec. 20), 1928.
4. Adler, F. H. *Clinical Physiology of the Eye*, MacMillan, New York, 1933.
5. MacMahon, H. E. and Weiss, Soma. *Am. J. Path.* 5:623 (Nov.), 1929.
6. Butsch, W. L. *J.A.M.A.*, 99:728 (Aug. 27), 1932.



# "Food-Poisoning"—A Public Health Problem\*

J. C. GEIGER, M.D., F.A.P.H.A., AND J. P. GRAY, M.D.

*Department of Public Health, San Francisco, Calif.*

FOOD-POISONING—as it is understood today—is the term used to describe the clinical syndrome resulting from the ingestion of food contaminated by certain types of bacteria. Although the affection has occurred more or less frequently, probably for centuries, its etiology and epidemiology, and therefore its control, have not been understood until comparatively recently. Having some knowledge of the etiology and epidemiology of food-poisoning, the lack of control over the mounting incidence of this reportable and preventable condition challenges students of public health and preventive medicine. The records in most departments of public health, particularly in those units enjoying fairly accurate reporting of the notifiable diseases, demonstrate the wide gap that exists between the comparatively poor results obtained with present day practice and those that could be had were the latest approved scientific methods properly applied.

In certain diseases, some of which have been devastating in their effects, as plague, malaria, yellow fever, smallpox, diphtheria, typhoid fever, and cholera, actual control has been approached, and even demonstrated on several occasions, particularly in armed forces; but any statement to the effect that tuberculosis, syphilis, influenza, acute anterior poliomyelitis, measles,

and pertussis, as examples from a large group, are under control, is misleading, to say the least. While the epidemiology is not entirely complete, the etiology is well known in some of the diseases, as tuberculosis and syphilis, and, indeed, we are fairly well informed of methods that may prevent the transmission of the causative factors, as in both tuberculosis and syphilis, but who can deny that even in these diseases new infections arise occasionally from known reservoirs of infection under treatment and so-called supervision?

Obstacles present themselves to resist measures directed at the prevention of the transmission of communicable diseases and of the occurrence of certain non-communicable but preventable diseases; but the justification for public health activities lies in the necessity for overcoming these same obstacles. The possibility of the control of food-poisoning, though not so attractive in some respects, perhaps, as many other problems, is of importance, and offers certain difficulties which merit more attention than that usually given.

It is not the intent of this paper to decry the health official as a disinterested individual of limited intelligence. Frequently, in the past, it has been emphasized that the health officer was usually a man who had one or the other of two backgrounds: he was a failure, or too old to carry on, as a physician or surgeon in the clinical field but the public was willing to have him act as health officer, or, he was a

---

\* Read before the Fourth Annual Meeting of the Western Branch of the American Public Health Association, Pasadena, Calif., May 29-31, 1933.

politically ambitious physician who achieved sufficient prominence to be given the appointment irrespective of his qualifications. Today, however, the field of public health is attracting young men of excellent training and background, in whom there is activity, alertness, and enthusiasm in their expectations of careers in preventive medicine and public health. Too frequently, certain details and problems are lost sight of in the direction of activities in metropolitan organizations or in the varied duties in the limited personnel of rural units. It is the purpose of this paper to point out the need for a better understanding of the problem offered in the control of food-poisoning, to emphasize the obstacles operating against the achievement of actual control, and to outline a program to be followed in approaching the problem.

The etiology and epidemiology of food-poisoning is fairly well understood; indeed, we are better informed on the etiology of this type of illness than we are on many other of the communicable and preventable diseases, as, for example, influenza, acute anterior poliomyelitis, and measles. In methods of control, we do actually know how to prevent food-poisoning, in direct contrast to our comparative helplessness in the face of an outbreak of the diseases mentioned.

It is not possible, in a paper of limited scope, to do more than list and emphasize the major points. Every health official is familiar with the difficulties nearly always encountered in the investigation of food-poisoning, but in directing attention to these points, it is hoped that seemingly lagging interest in the entire problem may be rekindled. Most obstacles can be classified under one of the following major groupings:

- III. Inaccurate understanding of the etiology.
- IV. Incomplete epidemiologic investigation.
- V. Inadequate laboratory studies.
- VI. Incomplete preventive service.
- VII. Restricted dissemination of accurate information.
- VIII. Lack of rational modern legislation.

Most of these obstacles to progress in the control of food-poisoning are met with in the control of all communicable and preventable diseases. With intelligent application of modern methods, all can be overcome. All but the first and last are direct responsibilities of the health official; and even for these exceptions (delayed reporting and lack of rational modern legislation), the health official must accept responsibility for the initiation of procedures necessary for their correction.

It is obvious that the success of any plan of attack directed at the control, not only of food-poisoning but of any communicable or preventable disease, will depend upon the effectiveness with which that plan deals with the obstacles presented. It is apparent, also, that the most important obstacle to be overcome lies in the correction of the lagging interest which affects the public health official as well as the public. The correction of all other difficulties outlined depends, directly or indirectly, on the health official's interest and initiative. The alert health officer will create a consciousness in professional and lay groups, and earlier reporting will be forthcoming; he will educate his organization to etiological understanding and from this background develop adequate epidemiological and laboratory study; he will improve the inspection service rendered by his organization, initiate well-founded and rational legislation, and make every attempt to enforce it with expedition; and, always, he will take advantage of every opportunity to disseminate accurate informa-

- I. Delayed reporting.
- II. Passive interest of health official and public.

tion intelligently and intelligibly. Perhaps the most important step in the control of food-poisoning, therefore, is the education of the health officer.

Food-poisoning is usually considered as of two distinct types: (1) *Botulinus* poisoning, or botulism, is a comparatively rare affection of high fatality rate, caused by the ingestion of food contaminated with the anaerobe, *Clostridium botulinus*, in which toxic products are formed. (2) Food-poisoning, *per se*, is a rather common affection of low fatality rate, caused by the ingestion of food contaminated with certain types of organisms and their metabolic products, particularly members of the paratyphosus-enteritidis group and, apparently, certain strains of the heavy pigment-producing staphylococci.

In botulinus-poisoning, the clinical manifestations of neurologic dysfunction are probably due to a neurotropic toxin which affects important neurologic centers after an incubation period of from 24 to 48 hours. In food-poisoning, however, the clinical picture is that of a gastrointestinal intoxication, probably due to a gastrointestinal irritant which is the metabolic product of the organism, after a relatively short incubation period of less than 4 hours usually, and less than 12 hours nearly always.

*Clostridium botulinus* has a widespread distribution in the soil as a spore, and in this form is considered harmless to man. It is killed at temperatures easily attainable in commercial food processing, and the toxic product, formed by the anaerobe in suitable foodstuffs as culture media, is thermolabile, being destroyed by boiling usually within 10 minutes, depending on certain variable factors, as consistence and quantity of the food, size and shape of the container, altitude, et cetera. The foods responsible for botulinus-poisoning are usually of home-canned origin.

The underlying cause for this probably lies in the so-called "cold-pack" method of canning, with inadequate temperatures and holding periods. The danger of commercially canned products as a source of infection in botulism is remote with present-day practice, which includes laboratory studies on each pack.

Members of the paratyphosus-enteritidis or food-poisoning group of organisms are not infrequently traceable to the gastrointestinal tracts of certain carriers, both human and animal, particularly rats and mice. These organisms are killed by comparatively low temperatures, but their metabolic products or poisons may prove to be thermostabile at various temperatures for different periods of time. Moreover, certain organisms usually considered innocuous, as, for example, proteus and cloacae groups, when they are permitted to grow in media or foodstuffs of high protein content, may also produce poisonous products which are gastrointestinal irritants to man. It must be realized, also, that even so-called invasive types of organisms, as *B. paratyphosus* (alpha) of human origin, as food contaminants, may cause food-poisoning only, without subsequent infections of more or less severe character.

Epidemiologic studies, while it is desirable to have them carried out by a medically trained personnel, may be made quite satisfactorily by lay inspectors or by public health nurses. The true epidemiologist has an inherent insatiable curiosity, combined with initiative and ability to determine the basic facts. These qualities must be present, at least to some degree, in the individual charged with the responsibility of investigating a report of food-poisoning. The art of question asking, as a means of obtaining accurate and unbiased information, is fundamental in its importance, and, in most instances,

requires development and training. Poorly asked questions often have been responsible for misleading and inaccurate information, in addition to the opportunities lost through the promotion of lack of confidence or antagonism toward the investigator.

The epidemiologist's primary interest lies in the particular food probably responsible for the affection. Careful questioning of a group of the individuals affected will furnish data of value in confirming the diagnosis and eliminating the various unrelated foods. Supplementing the determination of the food probably responsible, the epidemiologist obtains specimens of the food suspected, specimens of stool and urine from the food handlers, and of stool from affected individuals, particularly in those instances in which diarrhea is present. All specimens are to be obtained in sterile containers, without contamination from other sources, and sent to the laboratory, properly labelled, and as soon as possible. The epidemiologist has not completed his work until he has obtained every bit of essential information on the source of the suspected food, and definite data concerning the quality, condition, preparation, holding, storage and serving. The physical environment of the premises in which these procedures were carried out, with special attention to the possibilities of rat, mouse, and other animal infestation, and the methods employed in rodent control, is of import. A history should be obtained from every handler of the food, with specific data concerning the possibilities of any of the enteric fevers, not only recent but throughout his entire life.

Laboratory procedures are not fixed and unchangeable. Constant improvements in technic are being made, and health officials should assure themselves that methods used in their laboratories are kept up to date. The complete laboratory study must include the

application of modern technic in conducting bacteriological, immunological, and biological reactions, and chemical tests as indicated; but these studies should be used as confirmatory evidence and as diagnostic aids only, and should not be substituted for epidemiological investigation. The laboratory worker who relies upon routine procedures of a decade ago is doomed to disappointment. The use of enrichment media, new buffer salts, lower or higher pH levels, closed chambers permitting controlled changes of gas tensions, new immunological reactions, absorption tests, new cultural reactions, animal and human feeding experiments—these and many other refinements of technic are contributions that have made possible adequate laboratory studies in food-poisoning. Most of these are possible in the laboratory that is well equipped but not elaborate in its set-up, and their accomplishment is not beyond the capabilities of the well-trained laboratory worker.

The health official who understands the etiology and epidemiology of food-poisoning, who carries out a rational and reasonably complete investigation, and who has available in his laboratory the latest approved technic, has an efficient agency for the study of food-poisoning outbreaks; and from each study something constructive can be gleaned and in turn practised to prevent recurrences. In the control of food-poisoning, something more is essential.

The regulation and supervision of food establishments as carried out in most organizations is insufficient. Too frequently the food inspection service is concerned with the physical plant alone. Ratproofing, rodent infestation, water-proof floors, smooth, painted walls, refrigeration, ventilation, toilet and lavatory facilities, the outer clothing of the personnel:—these are important, but, in addition, the quality of the food, the preparation, holding, serving, and

handling of food, milk, and water, the cleansing of china and glassware, the polishing of silver, and, probably of greatest importance but so frequently not well supervised, the food handler himself—these are also full of possibilities as sources of infection in food-poisoning. In most cities in which health certificates are issued to food handlers, the medical examination has deteriorated into a venereal disease inspection, and the laboratory study consists of the examination of a smear for the gonococcus and a complement fixation reaction on blood serum, as evidence of gonorrhea and syphilis. The search for the bacillus carrier, not only of *B. typhosus*, but also for *B. paratyphosus*, *B. enteritidis*, and other members of this group, is the valuable examination often overlooked.

These activities are possible, of course, only if adequate legislation supports the health official. Legislation is dependent upon public opinion, and since public opinion is dependent upon education, there is a definite lag between new developments and the passage of legislation permitting the application of newer knowledge.

The great strides made in public health during the past half-century have been accomplished through the application of methods made possible as a result of research in the laboratory and the field. The epidemiologist, the bacteriologist, the immunologist, the physician, the dentist, the sanitary engineer, the public health nurse, the inspector, the veterinarian, the vital statistician, and the legislator—all have played their rôles; but in the years to come, further advances will be slow without health education. Most public health administrators recognize the need for organized programs in health education, but, unfortunately, funds are not available, in most instances, to promote this essential activity. It must be realized, of course, that health edu-

cation, to be effective, must be planned, not in terms of months or years, but of decades. Through the dissemination of accurate information in an intelligible manner, the populace may be educated, and many goals, now seemingly beyond reach, brought nearer. The well-edited bulletin, of attractive though not elaborate or expensive format, regularly issued, and placed in the hands of the interested groups, as physicians, dentists, nurses, educators, teachers, civic leaders, parents and others, is a method deserving attention and study. The statistical leaflet, full of tabulations of morbidity and mortality rates and classified causes of death, with addenda of numbers of inspections made and samples collected, will not meet these requirements; such a periodical is almost never read by those not actually engaged in public health work. The publication should be augmented by other projects, as radio broadcasts, selected newspaper publicity, lectures, and talks to interested civic, service, parent-teacher, professional and lay groups, and by published scientific articles and reports. Every member of the personnel of the department, and particularly the public health nurse, should take advantage of every opportunity in every contact to make friends rather than enemies, to encourage co-operation rather than antagonism, and to teach prevention rather than cure. The opportunities offered in health education are manifold.

#### SUMMARY AND CONCLUSION

1. The removal of obstacles to the control of food-poisoning justifies public health activities.

2. With an understanding of the etiology and epidemiology of food-poisoning, actual control is not unattainable; but there must be renewed interest on the part of the health official, and, through him, the awakening of professional and lay consciousness.

3. Emphasis is placed on the importance of understanding the etiology and epidemiology, of laboratory procedure and preventive services, of legislation and regulatory supervision of establishments and healthy carriers, and of health education, as measures to be used in a plan for coping with the prob-

lem of the control of food-poisoning.

Food-poisoning, although its cause, effects, and prevention are fairly well understood, continues to be reported. Its control is a not unattainable objective, but it may be reached only through the rigorous application of present-day methods and procedure.

---

## Amendment of Italy's Child Welfare Law

THE Italian law of 1925 establishing a national bureau of maternal and child welfare was amended April, 1933.

The law of 1925 provided for an annual appropriation of 8 million lire. This was soon found to be insufficient; therefore, according to the new law, the amount is to be determined annually.

For the purpose of obtaining greater flexibility the number of members of the council that administers the national bureau was reduced from 38 to 13, and that of the councils who administer the provincial branches of the bureau, called in the law provincial federations, from 21 to 11. Provision was made for the appointment to each provincial council of at least two representatives of maternal and child welfare agencies.

Under the old law each provincial federation had an executive committee of 9 members, selected from the members of the governing council of the federation. The committee attended to routine business, examined the questions to be submitted to the governing council, made suggestions, supervised

the functioning of public and private maternal and child welfare institutions and, in general, the administration of the laws regarding maternal and child welfare. Under the new law the executive committee has been abolished, and for the purpose of greater efficiency the functions of the committee have been transferred to one individual, namely, the president of the governing council of the provincial federation.

Both the old and new laws provide for the establishment in each commune of a committee of citizens to carry out in that locality the functions of the provincial federation. The new law prescribes that the members of this committee must be experienced in maternal and child welfare work, whereas under the old law this was not required.

The old law prohibited the serving of alcoholic beverages, including wine, to children and adolescents in schools and all other educational establishments; the new law specifies an age minimum of 16 years.—*Gazzetta Ufficiale*, Rome, Apr. 26, 1933.

# Ten Years of Public Health Administration in Ohio\*

ROBERT G. PATERSON, PH.D.

*Executive Secretary, Ohio Public Health Association, Columbus, Ohio*

IN this interpretation, there is presented the 10-year experience of Ohio in public health administration—1920 to 1929 inclusive. Answers are sought to such questions as: has the number of public health commissioners increased? what was their age? how long have they served? what was their salary? what qualifications did they have? and, what was the relation of the year of their appointment to the year they were licensed and to the date of their graduation?

The significance of the study lies in the fact that Ohio was one of the first states to cease placing reliance upon the township, village, and city subdivisions of government as the units of public health organization. In 1919 the General Assembly passed a law, the Hughes-Griswold Act,<sup>1</sup> which divided the local subdivisions of the state into three possible units for public health administration—the city health district, which embraces all cities in the state<sup>2</sup>; the general health district, which embraces all townships and villages in each county (referred to here as county districts); and a union of two general health districts or a general health district and a city health district located within such district<sup>3</sup> (referred to here as combined districts). This law be-

came effective January 1, 1920. These are the crude figures serving as background material with which the public health organization in Ohio has to deal.

Now what has happened in the administration of this organization in the 10 years which have elapsed from 1920 to 1929?

## NUMBER OF HEALTH DISTRICTS

In 1920 there were created 168<sup>4</sup> health units, 88 of which were general, and 80 city health districts. These replaced the former system in which there were 2,158 independent health districts divided into 80 city, 727 village and 1,351 township units.

Each of these 168 health units had a board of health and each was required to employ a health commissioner, who had to be a licensed physician in the general health district but was not required to possess any qualifications in a city health district.

## NUMBER OF HEALTH COMMISSIONERS

Analysis of the number of health commissioners in Ohio by type of service in 1920 and in 1929 is shown in Table III. In 1920 there was a total of 37 full-time and 129 part-time health officials in the three types of districts, while in 1929 the corresponding figures are 63 and 103.

The trend in both city and county units is definitely toward employment of full-time health commissioners and

\* Based upon a study made by John A. Ey, Jr., and presented to the Ohio State University in partial fulfillment for the degree of master of arts in the School of Social Administration, 1932.

TABLE I

BASIC DATA FOR OHIO 1920-1930

*The Basic Demographic Data for Ohio in the Decade 1920 to 1930*

Year	Population	Area Sq. Miles	Persons Per Sq. Mile	Number of			Per Cent	
				Coun- ties	Cities	Villages	Urban	Rural
1920	5,759,394	40,740	141.4	88	94	725	63.8	36.2
1930	6,646,697	40,740	163.1	88	110	752	67.7	32.2

a combined unit as the basic unit in administrative service.<sup>5</sup>

#### AGE OF HEALTH COMMISSIONERS<sup>6</sup>

The average age at appointment in 1920 was 44.3 years for full-time and 51.5 for part-time county districts; 48.0 years for full-time and 50.6 for part-time city districts; 43.2 years for full-time and 59.0 for part-time combined districts, while in 1929 the corresponding figures are 47.0 and 46.6; 42.5 and 30.6; and 39.0 for full-time combined districts.

Health commissioners appointed in the earlier years 1920 and 1921 were in the higher age groups while in the ensuing years, especially since 1926, the tendency has been to appoint younger officials. This is more true in the cities and combined districts than in the counties.

#### LENGTH OF TENURE OF HEALTH COMMISSIONERS

The data show that more officials served the entire 10-year period 1920-1929, than for any other number of years in the one office—20.2 per cent in the counties and 18.7 per cent in the cities. The average length of tenure for the three types of districts of the full-time officials is 4.9 years in the counties; 4.3 years in the cities and

4.0 years in the combined districts; of the part-time officials 4.9 in the counties; 5.1 in the cities. There were only 2 part-time officials in the combined districts so their experience cannot be compared with the two other types in this classification.

#### SALARY TRENDS

The group with the most officials within its limits received \$4,000 to \$4,500. The full-time officials in the counties and cities predominate in this class. Salaries of officials in the cities, both full-time and part-time, are rather low, 84.9 per cent under \$2,500. In the counties 82.3 per cent received less than \$3,500. In the three types of districts a total of 96.6 per cent received less than \$3,500. In only one group,

TABLE II

BASIC VITAL STATISTICS DATA FOR OHIO 1920-1930

Year	No. Deaths All Causes	Death Rate per 1000	No. Births	Birth Rate per 1000
1920	73,846	12.7	124,303	21.4
1930	75,500	11.4	117,611	17.6



TABLE III  
NUMBER OF HEALTH COMMISSIONERS 1920 AND 1929

Year	County			City			Combined		
	F. T.	P. T.	T.	F. T.	P. T.	T.	F. T.	P. T.	T.
1920	28	49	77	4	79	83	5	1	6
1929	26	45	71	18	57	75	19	1	20

(F.T.—Full-time; P.T.—Part-time)

those serving full-time in the counties, does the average salary for each year show a steady increase.

#### QUALIFICATIONS

The fact that by law all county health commissioners must be licensed physicians sets up uniform educational qualifications. Of the total of 83 full- and part-time officials in 1920 in cities, 61.4 per cent were licensed physicians. In 1923 this figure rose to 67.9 and in 1925 to 75.6. Physicians predominate among the health commissioners in cities since less than one-third were not licensed physicians. This has been found to be the case in other states as well as Ohio.<sup>7</sup>

Additional professional qualifications such as special university training in public health is so seldom encountered as to be negligible.

#### YEAR OF APPOINTMENT

The figures showing the relation of the year the officials were appointed to the year they were licensed as physicians and to the date of graduation from medical college reflect the tendency toward appointment of young commissioners in the cities. This is true especially since 1926. In the counties, however, since 1925 the trend has been to appoint officials in the older age groups.

#### CONCLUSIONS

The study covering the 10-year period 1920–1929 shows a definitely increased trend toward the employment of full-time health commissioners; there is a tendency toward the establishment of combined units of organization including the general and city health districts in a single administrative unit; the age of officials at appointment is in the direction of the younger age groups, 30 to 50; the salary level is low with the trend downward rather than upward; and about the only educational and professional qualifications required are those which are embraced in the general term "licensed physician."

Before public health administration in Ohio can be said to have reached a professional rather than an apprentice status it is evident that several fundamental principles must be established. There must be assured a sufficient tenure of office—not less than 5 years and preferably 7 years; a salary scale graded commensurately with the type and composition of the unit organization; a recognition that a public health administrator should have special university training similar to that required of our school administrators; a clearly defined set of qualifications beyond the blanket term "licensed physician" needs to be established to enable the tax payers to form judgments on this

point; and increased opportunities for special training should be afforded prospective public health administrators in our universities throughout the state.

#### REFERENCES

1. Laws of Ohio 1919, Vol. 103, Part 1, pp. 236-251.

2. A city in Ohio in contradistinction to the definition of the U. S. Bureau of the Census, Department of Commerce, is defined in the State Constitution, Article XVIII, Sec. 1: "Municipal corporations are hereby classified into cities and villages. All such corporations having a population of 5,000 or over shall be cities; all others shall be villages. The method of transition from one class to the other shall be regulated by law (adopted Sept. 3, 1912).

The regulation provided by law is that "municipal corporations, which, at the last federal census, had a population of 5,000 or more, shall be cities. All

other municipal corporations shall be villages. Cities which, at any future census, have a population of less than 5,000 shall become villages. Villages which, at any future federal census, have a population of 5,000 or more, shall become cities" (96 v. 20, p. 1) (Section 3497, Page and Adams Annotated Ohio General Code, Vol. 2, p. 3).

3. Subsequent amendment provided for a union of a city health district and a general health district or *vice versa*. (Laws of Ohio, 1931, Vol. 114, pp. 114-115.)

4. One general health district covering a small rural county without a city in it has never been organized permanently under the present law.

5. For the annual tabulations in this phase of public health work see Reprints from the *Public Health Reports* by the U. S. Public Health Service from 1912 to date.

6. See discussion on this point "Ages of Health Officers in Relation to Professional Training." John A. Ferrell, M.D., Dr.P.H., and Pauline A. Mead. *A.J.P.H.*, XXII, 9:904-908 (Sept.), 1932.

7. Report of the Committee on Municipal Health Department Practice. *Pub. Health Bull. No. 136*, July, 1923, Table 8, p. 28.

## Milk and Growth

1. The influence of the addition of milk to the diet of school children is reflected in a definite increase in the rate of growth both in height and weight.

2. There is no obvious or constant difference in this respect between boys and girls, and there is little evidence of a definite relation between the age of the children and the amount of improvement. The results do not support the belief that the younger derived more benefit than the older children. As manifested merely by growth in

weight and height the increase found in younger children through the addition of milk to the usual diet is certainly not greater than, and is probably not even as great as, that found in older children.

3. In so far as the conditions of this investigation are concerned, the effects of raw and pasteurized milk on growth in weight and height are, so far as we can judge, equal.—Leighton and McKinlay (1930), Dept. of Health for Scotland. Milk Consumption and Growth of School Children. *Report of an Investigation in Lanarkshire Schools*.

# Industrial Dermatitis in the United States\*

LOUIS SCHWARTZ, M.D.

*Senior Surgeon, U. S. Public Health Service, New York, N. Y.*

IN some countries, especially England and Germany, more attention has been paid to industrial dermatitis than in the United States. Since the promulgation of Workmen's Compensation Laws, the problem of industrial dermatitis has become of greater importance than ever in this country. Industrial dermatitis or occupational eczema contributes about 50 per cent of all claims for compensation due to conditions classified as industrial diseases. Even this does not represent the real incidence of occupational eczema because the majority of cases of industrial dermatitis do not incapacitate the worker, and only those workers put in claims for compensation who must stay away from work for one week or longer.

In our inspection of plants, we noted workers at their jobs affected with varying degrees of occupational dermatitis. Most of these cases were not reported, either because they were not serious in nature, or because the workers feared that a claim for compensation might militate against their retaining their positions. There were a few severe cases of dermatitis in men who were working because the compensation they might receive was less than they could earn.

We found some workers not reporting their condition because other workers

had told them that many new employees were affected in the same way, and that if they kept on with the work, they would become hardened and no longer be troubled.

## FREQUENCY OF OCCURRENCE

Skin diseases are associated with many occupations, the rubber industry causing rubber itch, tanning of leather chrome sores, oil refineries oil acne, dyeing establishments dye dermatitis, etc.

The amount of industrial dermatoses reported by the hospitals is very small. In one hospital in New York where there are over 20,000 new skin cases treated a year, there were only 53 cases per year of industrial dermatitis; in another having 5,000 new skin cases per year, only 5 cases per year of industrial dermatitis. In a private industrial clinic servicing various manufacturing establishments in Greater New York, out of 33,000 cases of all kinds treated over a period of one year, there were 103 cases of dermatitis.

According to statistics gathered from the States of New York, Missouri, Connecticut, Massachusetts, Wisconsin and Ohio, of 19,428 occupational diseases reported during the period covered by the records, 9,621 were occupational dermatitis, or about 50 per cent. In these states there was an average of 2,944 cases of occupational dermatitis per year—an annual rate of 48 per 100,000 of the industrial population.

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

These include only the more severe cases of dermatitis, and it is safe to say that if the minor cases which are not reported, or which are not disabled for a period of one week or more, were counted, it would be shown that there are many times this number of cases actually occurring per year in the United States.

#### CASES FOUND IN THE PRESENT STUDY

In the present study the industries examined were selected at random and not because of any undue prevalence of dermatitis. They included dyeing establishments, rubber works, oil refineries, candy makers, linseed oil works, and chemical manufacturing. Out of 18,567 workers examined, there were 285 occupational skin diseases found, a rate of prevalence of  $1\frac{1}{2}$  per cent.

#### CAUSATIVE AGENTS OF INDUSTRIAL DERMATITIS

The chief causes of industrial dermatitis differ in the various localities according to the prevailing types of industry present.

In New York State of 232 industrial dermatitis claims about 26 per cent were due to general irritants, such as acids, alkalies, chrome and turpentine, 13 per cent were due to plant and vegetable poisoning and 10 per cent were to dyes. Gasoline, benzine, oil and naphtha account for about 10 per cent.

In Missouri out of 1,020 cases, 69 per cent were due to lime and cement, 6 per cent to lye, 15 per cent to poison ivy,  $1\frac{1}{2}$  per cent to petroleum and 9 per cent to caustics and sulphuric acid.

In Wisconsin in the past ten years, of 1,909 cases of dermatitis, 17 per cent were due to toxic vapors, 42 per cent to toxic fluids, 20 per cent to irritating dusts and 15 per cent to poisonous dusts.

In Ohio, irritating dusts associated with the rubber industry have led the

list of causes of industrial dermatitis. Oils and cutting compounds, including lubricants, have been a close second, and at the present time, according to Dr. Hayhurst, undoubtedly lead the procession of skin irritants.

From these statistics, it can be stated that the majority of occupational skin diseases in these states are caused by acids, alkalies, caustics, oils, greases and solvents.

Plant poisoning by ivy, oak, sumac, primrose and wood dusts occurring among florists, gardeners, and carpenters, constitute a considerable percentage of cases of occupational dermatitis. In New York State out of 449 cases, 14 per cent, and in Ohio, out of 4,600 cases, over a 5-year period, 2 per cent were due to this cause.

#### COMPENSATION FOR INDUSTRIAL DERMATITIS

Only 11 of our states compensate for industrial skin diseases. The compensation laws in these states are not all the same. Some compensate for any occupational disease arising out of and in the course of employment; others specifically name the causative agent. Dermatitis is not specifically mentioned in some while in others the causative agents for which occupational dermatitis is compensated are named.

What is reportable or compensable in one state may not be so in another. This makes it very difficult to compile reliable statistics from the records.

#### CLASSIFICATION OF CAUSES OF OCCUPATIONAL DERMATITIS

To give a list of substances causing industrial dermatitis would be to give a list of almost every known chemical or substance, because idiosyncrasy or hypersensitivity or allergy can be developed towards almost any substance. The causative agents can be classified in various ways. One manner is as follows:

1. Physical Agents—such as heat and cold, radiation, etc.

2. General Irritants—such as acids, alkalies and caustics, etc.

3. Specific Irritants—These do not affect everybody but cause skin rashes in a considerable percentage of people. Such are paraphenylenediamine, hexamethylenetetramine, benzine, and certain oils and plants.

4. Fat Solvents—These act by dissolving the fat and oil from the skin and making it more sensitive to irritation.

5. Dehydrators — Crystalline substances which act by absorbing the moisture from the skin, such as salt and sugar.

6. Biologic Agents—Bacteria and pathogenic fungi.

Then there is a group of substances which affect only the skins of hypersensitive people. If these are met with at the place of employment, then the dermatitis is an industrial dermatitis due, partially to the substance and, partially, to the hypersensitivity of the individual.

There is still another group of people who, at first, are not sensitive to the materials with which they work, but after exposure to them for varying lengths of time, become sensitized or allergic and develop a dermatitis. These allergic forms of occupational eczema are related to hay fever, asthma and serum sickness.

#### CLINICAL FORMS OF OCCUPATIONAL DERMATITIS

Occupational dermatitis is, in its acute form, a dermatitis venenata, and does not have any characteristic appearance except when caused by a few substances such as arsenic and poison ivy.

Fat solvents cause the skin to become dry and cracked, and dehydrators give a parchment-like, scaly appearance. Aside from the few general characteristic appearances caused by a few skin irritants, the appearance of the skin gives no clue to the irritant causing the condition.

Occupational dermatitis in its acute

stage is characterized by erythema, edema, papules and vesiculation of the exposed parts. Other parts of the body may also be affected, especially when the clothes are penetrated by the offending material. Later on crusting and desquamation may occur. Complications such as pus formation and parasitic infections may entirely change the picture of the original disease.

The first attack of occupational dermatitis may disappear while the person is working and it may never appear again. It may disappear after the person stops working and not appear again upon resuming work, or it may disappear upon stopping work and reappear when resuming the work, or it may become chronic with acute exacerbations.

It is characteristic of a typical occupational dermatitis that it appears when the person is exposed to the offending substance, disappears after the exposure has ceased and reappears when the person is again exposed. This is a classical picture and is not always met, because other conditions complicate the matter.

There are some people who, when they first begin work, develop a mild dermatitis which, after a while, disappears, leaving them immune. There is another class in whom the dermatitis develops in so severe a form that it necessitates staying away from work, and when they return to work the condition reappears. Such people are likely to discontinue that occupation of their own accord. There is still another class who develop an immunity while working but this is short lived, and if they discontinue working for a week or two, then come back to work, they again contract the dermatitis and again may develop an immunity. In other words, continuous exposure among such people develops an immunity which lasts a short time.

Some workers have alternating re-

missions and exacerbations of dermatitis while at work. These cases are difficult to explain. It may be possible that the conditions under which they work are not constant although they appear to be. The dermatitis itself may exhibit a periodicity due to variations in the resistance of the patient or to variations in his sensitivity.

There is still another group of cases described by Rudolph L. Mayer, in which the primary dermatitis is followed by frequent relapses and, finally, a chronic condition persists even after elimination of the offending substances; that is after giving up the employment. Mayer explains that in these cases there gradually develops a nonspecific polyvalent sensitivity of the skin to many things that are encountered in the course of daily life. Secondary infections with pus organisms and molds may also take place in these cases, and the resultant sensitivity may complicate the disease. It is very difficult in such cases to prove that occupation was the original cause of the condition.

#### DIAGNOSIS OF INDUSTRIAL DERMATITIS

In making examinations of workers, many skin conditions such as psoriasis, lichen planus, impetigo, scabies, etc., were found which had no relation to the occupation. In making a diagnosis of industrial dermatitis, it must be determined whether or not the man is exposed to a general irritant, and if he is, whether the eruption developed before or after beginning the occupation. If there is no exposure to a general irritant, it must be determined whether there is a sensitivity to any of the materials with which the person comes in contact in the course of his employment. This can be done by means of patch tests, applied as follows:

Eight thicknesses of gauze  $\frac{1}{2}$  inch square are saturated with the material suspected of causing the dermatitis, and placed on a clear portion of the

skin. It is best to select, if possible, a clear portion of skin immediately adjacent to the eruption on the theory that the portion of the skin nearest to the eruption is most sensitive to the chemical. The gauze is covered by a piece of dental rubber about 1 inch square so as to keep in the moisture. This is covered by a piece of cotton flannel about  $1\frac{1}{2}$  inches square, in order to keep in the heat, and covered with a piece of adhesive plaster 2 inches square. The patches may be removed at the end of 24 hours and the skin underneath inspected. If the skin is sensitive to the material, there will be a reaction varying from an erythema designated as +; to an erythema with edema designated as ++; erythema, edema and vesiculation, designated as +++; to an erythema, edema and ulceration designated as ++++.

In cases where materials are used which are innocuous to a normal person, the patch may sometimes be left on for as long as five or six days in order to obtain the reaction. Care must be exercised in doing patch tests with general irritants. If hypersensitivity to dilute solutions of these materials is suspected, then such dilutions of them are to be used as will not ordinarily affect the normal skin. For instance, a 1 per cent solution of potassium bichromate has been found not to affect the non-sensitive skin but does produce a reaction in people sensitive to chromium. In the case of turpentine sensitivity, 1 part of turpentine to 9 parts of olive oil may be used. I have found cases in the candy industry so sensitive to the oil of cinnamon that a solution of 1 drop of oil in 49 drops of olive oil produces a marked reaction after 24 hours.

In doing patch tests, it is best to have controls, using an individual who is doing the same work as the patient but who shows no skin eruption. A blank control patch or one with some other

substance can also be used. Sometimes there is no reaction found under the patch when taken off, but a day or two later a reaction develops at the site of the patch. These are called delayed reactions and also indicate a hypersensitivity.

Patch tests, if properly done, are reliable in showing either acquired or natural hypersensitivity. If they do not give positive results, intradermal tests similar to those done for asthma may be tried, but these are of less diagnostic value.

#### EPIDERMOPHYTOSIS AS AN OCCUPATIONAL DISEASE

Fungus infections and epidermophytids offer a serious problem in the diagnosis of industrial dermatitis. It is often very difficult to say whether the condition is due to a man's occupation or not.

In our inspection of the workers in the various plants, we often came across cases of fungus infection of the hands and of apparent allergic reactions called epidermophytids or trichophytids on other parts of the body due to absorption of substances from the localized fungus infection. These were, in many instances, wrongly diagnosed as occupational dermatitis. There are, however, certain occupations which predispose to fungus infections because, during the course of employment, the person is exposed to pathogenic fungi or because the skin becomes moist, hot and macerated, and forms a favorable site for the growth of fungi. Barbers and bathhouse attendants are examples in which there is a special exposure to the action of fungi, and among them fungus infections of the hands, feet and nails are often seen. Among stokers, firemen and men who work in rubber vulcanizing pits, there develops, on account of heat and moisture, a soggy condition of the skin in the interdigital spaces, and this favors the development of fungi. We

have also found an unusual prevalence of tinea of the hands and feet among workers with raw wool.

#### CANCER AND OTHER GROWTHS IN INDUSTRY

Certain industries predispose to the development of carcinoma. Carcinoma of the bladder occurs with unusual frequency among workers in synthetic dyes. Arsenic has also been blamed as a cause of cancer. We are all familiar with the carcinomatous degeneration taking place in X-ray and radium burns among physicians and technicians handling X-rays and radium. Cancer of the scrotum among chimney sweeps in England has been known for many years, and a similar condition has been discovered among arsenic smelters.

In workers in some of the oil refineries in this country, we have noted carcinoma of the cheek and of the lip, and among paraffin pressmen, of the hands and of the scrotum. We have also noted an unusual prevalence of small, flat, pigmented papillomata on the dorsum of the hands, the forearms and legs of workers in oil refineries and among machinists and mechanics who handle oils and greases. More than 10 per cent of such workers were found to have these growths.

Among mule spinners in England there is reported an unusual prevalence of carcinoma, but in a large woolen mill in this country, we found no cases of carcinoma. It may be that the oil used in softening the wool in this country is different from that used in Europe. The factory in which our examinations were made used vegetable oil.

#### PREVENTION OF INDUSTRIAL DERMATOSES

The ideal prevention would be so to safeguard the industries which are dangerous that the injurious chemical could not come in contact with the skin of the worker. This is impossible in a

great many cases. Protection of the worker against irritating substances such as acids, alkalies, caustics, etc., by the wearing of suitable rubber gloves and clothes will often keep down the number of cases of industrial dermatoses.

In factories where such irritating substances as the irritant dyes, paraphenyldiamine, etc., are used, or the rubber industry where certain irritants in the form of accelerators and anti-oxidants are used, patch tests may be done on applicants for employment to determine their susceptibility to the materials which they will be called upon to handle, and those found to be hypersensitive should be rejected. Those workers who become sensitized after a long period of occupation should be shifted to other departments.

In factories where the skin hazard is great, personal hygiene must be emphasized. Workers must take baths and change clothes before leaving the plant, and for this purpose adequate toilet and washing facilities should be provided. Supplying clean towels daily to workers in oils and greases with instructions to wipe the hands and arms frequently has, according to Dr. Hayhurst, kept down the number of cases of dermatitis. Chemists and engineers should constantly strive to substitute harmless substances for the irritants which are now used. The installation of proper ventilation, exhaust hoods, totally enclosed dust-proof and gas-proof units

will, by allaying dust and fumes, play a large part in preventing the occurrence of industrial dermatoses. Protective ointments smeared over the exposed parts have, in some instances, been advocated.

#### TREATMENT OF INDUSTRIAL DERMATOSES

A person who is sensitive to the materials with which he works should seek some other occupation. Industrial dermatoses if uncomplicated will disappear when the person is away from the substance which has irritated his skin so that a cessation of work will usually cure the condition. If complications in such forms as suppuration or parasitic infection have set in, they must be treated and they may not be easily amenable to treatment. If a man must go back to his work after he is cured, he should be told to protect the parts by wearing long sleeves or gloves or by rubbing in protective ointment, as advocated by Dr. J. S. Millard of the Goodyear Rubber Company.

Desensitization by injecting minute quantities of the offending material underneath the skin has been tried but with no great success.

New synthetic chemical compounds are constantly being discovered and used in new industrial processes and many of these compounds are skin irritants. This constantly increases the industrial skin hazards and challenges the ingenuity of the sanitarian in devising preventive measures and cures.



## LETTER TO THE EDITOR

TO THE EDITOR:

In *Community Health Organization*, 1932 edition, by Professor Ira V. Hiscock, there are certain figures and statements on present standards of laboratory work per 100,000 population which have recently been critically examined by the Council of the New York State Association of Public Health Laboratories. As a member of this Council I have been interested in comparing the standards offered with the actual experience in public health laboratories of New York State. While I fully endorse the introductory paragraph of the chapter on Laboratory Service, it is impossible to subscribe to what he offers as present standards of laboratory work.

The implications in this chapter are that a community can provide adequate laboratory service for 100,000 people by facilities to do 6,000 public health examinations a year. With the coöperation of others on the Council a table has been prepared, showing the experience in New York State for the last 3 years for which figures are available. From the recorded experience in this state it is quite clear that all of Professor Hiscock's figures are much too low, viewed either from the standpoint of representative urban or rural communities. Six thousand public health examinations a year per 100,000 population are only a fraction of the necessary work. It is unfortunate to have the erroneous impression go forth that a community of 100,000 people can on such a basis establish or maintain adequate laboratory service.

The accompanying table has been compiled so that the discrepancies between Professor Hiscock's figures and those recording the experience in New

York State are made to appear as small as possible. Many essential public health examinations such as those in the diagnosis of poliomyelitis, amebic dysentery, septic sore throat, and laboratory examinations which are for clinical diagnosis and not, strictly speaking, a part of public health work, are not included in these figures because statistically they are grouped under "Miscellaneous." Of course, such a distinction is open to question.

Broadly considered, the public health work in any community is directly dependent upon and proportional to the standards of medical practice in that district, and early differential diagnosis of disease is an essential basis for safeguarding the public health even if considered only from the point of view of the control of epidemics and the spread of communicable disease. I have made no attempt to include any figures for laboratories not on the list of those approved in New York State, so that the statistics from these districts are conservative in that they probably do not represent the actual total.

The method of handling the figures has in another respect made the discrepancy between those in this book and the New York State figures less marked. Those in the table are for a 3-year average. During the period covered the increase has been about 27 per cent. If only the figures for 1931 were compared with Professor Hiscock's, the inadequacy of 6,000 examinations a year per 100,000 population would appear even greater.

Making all these allowances in favor of Professor Hiscock's estimate, it still seems clear that 6,000 examinations a year per 100,000 population are less than one-third of the number that

TABLE

	Public Health Exams. per 100,000 pop.	Wasser- mann Exams. per 1,000 pop.	G. C. Smears per 1,000 pop.	Diphtheria cultures per resident deaths	Tuber- culosis Exams. per resident deaths	Widals per resident deaths
	(1) (a) (b)			(c)	(c)	(c)
Prof. Hiscock's Estimate	6,000	20	3	250	6	80
<i>New York State—Urban:</i>						
Buffalo City Laboratories	41,490	193	23	714	34	73
Utica " " (e)	21,008	102.6	26.6	1,076	12.8	157
Albany " " (f)	20,151	82	34	564	22	156.9
Syracuse " "	38,672	159	40	4,474	24.7	544
<i>New York State—Rural:</i>				(rate: 0		
Tompkins County Lab. (g)	12,166	75	8.5	(exams: 330	11.6	167
Otsego " "	11,100	61	8	631	17	1,074
Cattaraugus " "	25,241	59	7	348	24	513
<i>New York State—Rural and Urban:</i>						
Monroe County Lab. and Rochester City Labs.	28,348	178	13.7	2,246	15	355
<i>Total New York State</i> Exclusive of New York City	19,132	88.6	13	801 (d)	21 (d)	135 (d)

(1) "Public Health Examinations": Figures used do not include such examination as Throat Cultures for predominating organisms, spinal fluids, stools for ova and parasites, urines, etc., which might have been public health work but which are statistically grouped under "Miscellaneous" in the Annual Report of the Division of Laboratories & Research. Neither have we included examinations done by laboratories approved only for milk and water tests, such as dairy company laboratories.

(2) Sources of information:

(a) Actual figures of tests done in above laboratories taken from annual reports submitted to the Division of Laboratories & Research, New York State Dept. of Health, using an average of 1929, 1930, and 1931 figures.

(b) Population figures taken from U. S. Census, 1930.

(c) Figures for resident deaths secured from Division of Vital Statistics, New York State Dept. of Health. An average of 1929, 1930, and 1931 rates was used.

(d) Resident deaths for year 1930 used.

(e) Examinations done at Utica State Hospital not included.

(f) Examinations done by Division of Laboratories & Research (State Lab.) not included.

(g) Examinations done at Clin. Lab. Medical Adviser's Office, Cornell Univ., not included.

Note: Total public health examinations done in above urban and rural laboratories increased 26.9 per cent from 1929 to 1931. The 3-year average used in above calculations therefore gives in most cases a lower figure than that which existed in 1931 or 1932.

The laboratories of Tompkins, Otsego, and Cattaraugus Counties were selected as most representative of the purely rural districts where only the county laboratory operated and where there are no large cities.

present standards and an adequate health program demand. In this connection a recent survey by the New York State Association of Public Health Laboratories in New York State showed that in many localities the physicians fail to use the laboratory facilities as much as they should. Hence, the New York State figures are smaller than a really adequate public health program requires.

A second point requiring comment is the implication in the chapter on public health laboratory service that a trained pathologist as director of the public health laboratory is unnecessary. He states that the chief of the laboratory service should be a bacteriologist, and the inference, I take it, is that the director need not be a graduate in medicine. Again the experience in New York State, in the

opinion of many who have observed the workings of public health laboratories, is at variance with this point of view. One of the most useful functions of a director of a public health laboratory is to coöperate with practising physicians in a consultant capacity and to disseminate information on all types of laboratory procedures. These contacts and the correlation of the clinical aspects of public health work and laboratory diagnosis can be achieved far more successfully if the director of the laboratory is a graduate in medicine who has been trained in pathology. The experience in New York State appears to have demonstrated that a population of 100,000 people should have a public health laboratory under the direction of one of great experience and wider point of view than a bacteriologist without training in medicine.

From the foregoing it obviously follows that Professor Hiscock's budget allowance is also inadequate. Accurate

figures of the experience, from the budget point of view, of the laboratories in this state are not readily available, but the inadequacy of the budget given by Professor Hiscock for a laboratory in a community of 100,000 is only a little less than that of his figures for the number of examinations.

*Note:* If the figures for "examinations" in Hiscock's book refer to specimens submitted for examination and not to the laboratory tests performed, the validity of the criticism offered in this communication is unaffected. The New York State figures given in the accompanying table are for "examinations." Only in the case of the complement-fixation test for syphilis is there much difference between the figures for "examinations" and those for "specimens" and here the percentage difference is less than 100. In all the other tests included in the table the difference between "examinations" and "specimens" is trivial.

G. M. MACKENZIE, M.D., *Director,*  
*Otsego County Laboratory,*  
*Cooperstown, N. Y.*

---

## TYPHOID CASES AND DEATHS IN NEW YORK STATE

### A CORRECTION

IN a recent advertisement prepared by Wallace & Tiernan Co., Inc., and published in this *Journal*, there appeared a reproduction of an Associated Press item which said: "Since 1928 there have been 10,000 fewer deaths and 100,000 fewer cases of typhoid fever than if the 1928 level of the disease had prevailed."

Obviously the Associated Press

report was at variance with the facts, as there were only 209 deaths from typhoid fever in New York State in 1928.

We are informed that the statement should have read 1906 and are asked by the advertisers to offer this explanation and to clear the New York State Department of Health of any responsibility for the erroneous statement.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZŮCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMANN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, D.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, D.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. RUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## ENCEPHALITIS IN ST. LOUIS

THE epidemic of encephalitis in St. Louis, Mo., is the major medical event of the year so far. While attention was called to some cases about the third week in August, there is evidence that they began late in July. At the present writing, 475 cases, with 71 deaths, have occurred; but of course these figures are good only for the time of writing. The mortality has been about 14 per cent.

There have been cases of encephalitis lethargica in St. Louis in 1919, 1924, and 1932, but the present outbreak is by far the most serious which has occurred. It bears little resemblance to the classic disease described by Economo in 1916 and 1917 in Vienna, but is much more like that on the Inland Sea of Japan in 1924,<sup>1</sup> which was similar to that seen in Australia in 1917-1918, and called there the "Mysterious X-disease." The death rate in Australia reached 70 per cent. The present epidemic differs from that, in which 50 per cent were under 5 years of age, in that the great majority of cases are over 15 years—only 19 per cent being under this age—and the case fatality is greater in the higher age groups—35 years and above. Japan has experienced 13 outbreaks, one of which in 1873, though limited in extent, showed a mortality of between 80 and 90 per cent. The largest epidemic in Japan was in 1924, which came on suddenly, showing a large number of cases in widely separated areas almost at the same time. Some 7,000 cases occurred, with a death rate of 60 per cent, 66 per cent of which were over 40 years of age, and 34 per cent under that age. Two smaller epidemics have occurred in Japan since that time, in 1925 and 1929, the last with a death rate of 65 per cent.

The epidemic in St. Louis corresponds more closely to the Japanese type as described than any other of which we know, yet there are many cases which do

not correspond with this type, and it is not too much to say that not only the profession in St. Louis, but the officers sent there from Washington by our Public Health Service are puzzled over the situation, and are not prepared to make dogmatic statements. The epidemics in Japan showed a tendency to reach their peak about the last week in August. The great epidemic of 1924 occurred in a summer which was unusually dry and hot, which is true of St. Louis also, the summer having been the driest since 1837.

St. Louis offers a situation which is unique in some respects. The city is credited with 1,200,000 inhabitants. The city proper has not enlarged its boundaries since 1876. Whenever expansion became necessary on account of the increase in population, municipalities have been founded in suburban areas around it. There are upwards of 20 such municipalities, each having its own separate government, yet one does not know when he is in a suburb and when in the City of St. Louis. These groups, which are politically separate entities, correspond to what would be generally called outlying wards. The drainage problem has been acute. The river Des Peres has been used as a common sewer, and whenever the wind is in the right direction the stench is observed in the city. All of these outlying municipalities drain into some such stream, the majority into the river mentioned, which is at best little more than a creek.

The mosquito situation this year is extreme. There have been four dry years in succession, and the present summer has been excessively dry, only one really heavy rain having occurred since June. The result is that this common sewer is unusually foul. According to the testimony of an expert from the Public Health Service, an ordinary tumbler full will contain from 5,000 to 8,000 mosquito larvae. The Health Officer states that anywhere along this stream where there is a quiet place, one may dip up a mixture which is three-fourths larvae and one-fourth water—as he expressed it, “a living soup of larvae.” Of course attempts have been made to connect the sewage situation with the outbreak, so far without any success or apparent good reason; but other lines of research have been equally abortive. However, as a matter of precaution, all patients in hospitals are screened.

So far, approximately two-thirds of the cases have occurred in what is called St. Louis County, embracing the various municipalities referred to, and one-third in the City of St. Louis. In the business section where comparatively few people reside, there have been few or no cases. The section of the city occupied by thrifty people of German descent has been practically free, as has also University City, which corresponds to this in thrift and cleanliness. There have been only 14 cases among the Negroes who form 12 per cent of the population, although the housing in the section occupied by them is perhaps the poorest anywhere.

In only four instances is there positive evidence of 2 cases having occurred in the same house. In one, a nurse and a child were stricken simultaneously, pointing to a common cause, rather than to contact one from another. The experts studying the situation all admit that there are many more cases than have been reported, which one would expect. There have also been many cases not diagnosed as encephalitis, which when looking backward would probably be classed as mild or abortive cases of the disease.

One striking feature of the outbreak is that the patients who do not die get well quickly, in some cases, as a neurologist connected with one of the hospitals in the city says, “miraculously so.” It is, of course, too early to speak of subsequent damage to the nervous system. Some effects may appear, as they have in

other epidemics, after several months, but at present, complete and even rapid recovery seems to be the rule.

Post-mortems have been done on all patients who have died. The lesions found so far are of the same nature, but at a higher level and more diffused than usually found in lethargic encephalitis. The cortex is involved and there is no tendency toward a localization in the central nervous system such as the basal ganglia and the brain stem. Many cases show a marked inflammation of the kidney with rather diffuse hemorrhages.

The incubation period seems to be 5 to 12 days, and the onset fairly sudden—in many cases extremely so.

The U. S. Public Health Service has been invited into the city. Already seven officers have been there and four more have been ordered to report. The Federal Treasury Department has granted \$25,000 for a study of the disease. Senior Surgeon J. P. Leake has been in charge of the epidemiological study. Dr. George W. McCoy, Director of the National Institute of Health, has been there for some days in a consulting capacity. Dr. L. L. Williams, who is in the plague unit of the Public Health Service, and has been trained as a mosquito man, has made a survey of the territory and, more recently, Dr. Cornelius B. Phillip, an entomologist connected with the Rocky Mountain Spotted Fever Laboratory in Hamilton, Mont., has arrived. Those recently ordered include laboratory experts, epidemiologists and special research men. The Health Department of the city is under the competent management of Dr. J. F. Bredeck, with Dr. P. J. Zentay as Assistant Health Commissioner.

Needless to say, the school situation has attracted much attention. The schools in St. Louis have opened on schedule September 5, with some 95,000 enrollments. The various colleges throughout the state will also open as usual, though there is some alarm being shown by those who have enrolled, and some are cancelling their reservations.

No cases have been reported from central Missouri, but some 45 have occurred in the neighborhood of Kansas City. A house-to-house canvass will be made, and it is to be hoped that the opportunities for study will clarify some of the problems connected with encephalitis in general. It remains to be shown whether the various epidemics considered, as well as the one at present in St. Louis, are due to distinct etiological entities, or can all be referred to a single causative agent, at present unknown, as is the mode of transmission, though personal contact seems now to be the most important factor.

NOTE: At the present time, September 21, the epidemic shows signs of decline. Total cases number 910, deaths 160—in the City, 428 cases and 83 deaths; in the County, 482 cases and 77 deaths.

## VITAMIN D MILK AND THE HEALTH OFFICER

THE progress of science often creates new administrative problems for public health officials. The development and increasing popularity of "Vitamin D Milk" is an example, for the widespread use of this desirable antirachitic has raised important questions as to its most effective control by health officers and food and drug officials.

Although vitamin D milks have been on the market for only about two years,

they are now distributed in more than 100 cities in 20 states.<sup>1</sup> At first such biologically activated milks were confined to certified milk and were produced under rigidly controlled scientific conditions by those who conducted the research work and developed the products. Later, other certified and Grade A pasteurized milks were properly included, but now a few dealers are offering lower grades of milks with increased vitamin D potency.

Since the primary function of these biologically activated milks is to supply vitamin D in sufficient quantities to prevent and cure rickets in infants and young children, it is obvious that only milks of known high sanitary quality and low bacterial content should be used for this purpose. The utilization of possibly inferior quality milks, with relatively high allowable bacteria contents, as carriers of vitamin D is, in fact, usually done for mercenary and competitive purposes, and not as a contribution to public health. For these reasons, such milks should not be tolerated.

Three methods for the production or preparation of vitamin D milk are now in operation. The first and most widely employed is a natural method, in which irradiated yeast is incorporated in adequate amounts in the feed of cattle. By the proper use of this system, fluid milk is obtained with an entirely satisfactory vitamin D potency, sufficient to cure rickets when from 20 to 24 ounces are consumed daily. This method is best carried out on large farms having proper technical facilities, since intelligent and competent supervision is required.

The second method is by the carefully controlled direct irradiation of the fluid milk by carbon arc lights of proper strength. Here again, careful supervision by experts is necessary. This process may be compared to pasteurization as a treatment of milk, a desirable process which is a necessary factor in disease prevention. According to Hess,<sup>2</sup> irradiation of fluid milk provides the most desirable anti-rachitic for the community prevention of rickets, a malady which is now much too prevalent in this country. This method is in operation in Detroit, but has not yet been adopted in other cities, although a well known brand of dried milk made from irradiated fluid milk has been on the national market for several years.

The third method is by the addition of a concentrate of cod liver oil to milk. The concentrate is supplied to milk dealers who are instructed as to the proper ways of adding it, and a considerable number of dairymen have been licensed to use this system. As pointed out in the report of the Committee on Milk and Dairy Products,<sup>3</sup> such a vitamin D milk is a modified milk and should be labelled as such. Some authorities have characterized this process as an adulteration of milk. As in the cases of the other two methods, intelligent technical use of this system is required.

From the standpoint of control, one important duty of health and food and drug officials is to make certain that all alleged vitamin D milks are always actually potent in the antirachitic substance, and this is also true of the medical milk commissions under whose certification products labelled "Vitamin D Certified Milk" are dispensed. Another duty is to require proper labelling of these products, but at present this is a rather complicated matter and might cause misunderstandings due to the methods of bio-assays and the potencies of milks produced or prepared under the several methods. A third duty is to make sure that the milks themselves are of acceptable sanitary quality.

The average health official does not have facilities for bio-assays of the vitamins in milk. These can be made only in properly equipped bio-chemical laboratories, such as exist at large universities and at some agricultural experi-

ment stations. The bio-assays should be made routinely every two or three months in the case of "yeast" milk, and possibly oftener for the other types, especially if there seems to be any fluctuation in results. Recording devices analogous to temperature control for pasteurizing machines, are being developed for irradiation processes and will serve as effective aids to control officials.

To date no scientific evidence has been advanced to show that there is danger from an excess of vitamin D in these milks, but there may be a hazard from lack of it. If the proper potency is not maintained, physicians and consumers who rely on them as antirachitics will be defrauded and public health will suffer. According to Hess,<sup>2</sup> an intake of from 20 to 24 ounces of irradiated milk containing from 50 to 56 rat units of vitamin D to the quart is satisfactory; "yeast" milk should have not less than 90 units; while cod liver oil must possess at least 250 units to be effective; and viosterol requires from 600 to 800. From these facts, it is obvious that the irradiated and "yeast" milks have certain advantages as antirachitics, especially since they are also the best dietary sources of the necessary minerals, calcium and phosphorus.

The labelling of all milks may be governed by local statutes and regulations, but the vitamin D milks should be specially labelled to show exactly what they are, and this labelling should be permitted only if potency is demonstrated. As a temporary expediency it may be suggested that as a natural milk supply, the "yeast" milk may be designated only as "Vitamin D Milk." Irradiated milk should be so labelled, with the added phrase "Vitamin D Milk," but that made by the use of a concentrate should be designated as a milk so modified. Statement of rat units or potency on labels apparently is impracticable at present. The actual grade of the milk, such as "Certified," "Grade A," etc., should also appear on the label.

Since the appearance on the market of the first vitamin D certified milk in the summer of 1931, many scientific investigations have been conducted on this type of milk and many contributions have been made to the literature on the subject. A number of valuable papers on vitamin D milk have been published in this *Journal*,<sup>4</sup> while the subsequent literature has been mentioned in the recent brilliant paper by Hess.<sup>2</sup> Health officials in communities where vitamin D milk is now or is about to be distributed, should familiarize themselves with all of this valuable material, and they should be prepared to exercise zealous surveillance over these special milks, the proper use of which can do so much to promote the public health.

#### REFERENCES

1. Tobey, J. A. Vitamin D Milk. *Hygeia*, Aug., 1933.
2. Hess, A. F. and Lewis, J. M. An appraisal of antirachitics in terms of rat and clinical units. *J.A.M.A.*, 101:181 (July 15), 1933.
3. A.P.H.A. *Year Book*, 1932-1933, p. 82.
4. *A.J.P.H.*, Dec., 1932; Jan., 1933; Mar., 1933.



# ASSOCIATION NEWS

## ENTERTAINMENT AND INSPECTION TRIPS

### INDIANAPOLIS

THERE will be feast for the mind and satisfaction for the soul for four days beginning October 9 when the American Public Health Association meets in Indianapolis.

The Entertainment Committee is planning a series of trips to interesting points, and occasions when the seriousness of the meetings may be set aside for lighter diversion. At 10:00 A.M. on Monday an inspection trip to the Purification Plant of the Indianapolis Water Company is being arranged, and at 2:30 P.M. on the same day there will be a trip to the Biological Plant of the Eli Lilly Company. This plant is approximately 20 miles east of Indianapolis on the National Road just outside the town of Greenfield where James Whitcomb Riley, the children's poet, first saw the light of day. For the visiting ladies a tea and travel talk will be given at the same hour at Sculptor's Hall, John Herron Art Institute. The speaker on this occasion will be Dr. Charles P. Emerson, a member of a commission which last year visited the Orient, and who in his interesting and inimitable style will give his impressions of that part of the world. The day's entertainment will close with music and dancing at 9:30 P.M. following the Presidential Reception.

On the morning of Tuesday, October 10, the Eli Lilly Company will take those signing up for the trip through their Indianapolis Plant, and at 2:30 P.M. buses will transport delegates and visitors to the meeting to the Indianapolis Medical Center. This Medical Center consists of a group of hospitals,

which includes the Indiana University School of Medicine, the Indiana University School of Dentistry, the Indianapolis City Hospital, the Robert W. Long General Hospital, the Coleman Maternity Hospital, and the Riley Memorial Hospital for Children.

To lovers of the American folk song a visit to Foster Hall will be of interest on Wednesday at 10:00 o'clock in the morning. Foster Hall was built by Mr. J. K. Lilly and dedicated to the memory of Stephen C. Foster who gave us such treasures as "Old Folks at Home," "Uncle Ned," "Old Kentucky Home," "Nelly Was a Lady," and other masterpieces which have traveled through the century. Foster Hall has a collection of original writings and belongings of Stephen C. Foster and is the best of its kind in the United States.

On Wednesday afternoon at 2:30 a tour of Indianapolis will take place which will offer the opportunity of seeing points of interest, which include the Scottish Rite Cathedral reputed to be the finest cathedral of its kind in the country; the national headquarters of the American Legion, home of James Whitcomb Riley, the famous motor speedway, beautiful municipal parks and playgrounds. While on this visit it is expected that there will be a 20-minute concert by the carillon of the Scottish Rite Cathedral. These chimes came from Loughborough, England, and were donated by one of Indianapolis's citizens at a cost of \$250,000. A Memorial Session at which there will be some of the survivors of the Havana Yellow Fever experiments and the

banquet will take place Wednesday evening at 6:30, following which there will again be dancing and refreshments to offset the strenuous day's activities.

An inspection of a model sewage plant in one of the smaller towns not far from Indianapolis will be made on the afternoon of Thursday, October 12, by sanitary engineers.

Transportation will be furnished for all trips, and automobiles will be available for those desiring special trips or visits. Of course there will be golf during the entire week and a special arrangement for golf by the ladies at one of the Indianapolis country clubs—and a shopping tour is also being planned for the lady visitors.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

- Frank O. Alley, B.S., Box 238, Bar Harbor, Me., Health Officer  
J. Leake, M.D., New Kien Bldg., Portsmouth, Va., Health Director, Norfolk-Princess Anne Counties  
J. S. McBride, M.D., 300 Public Safety Bldg., Seattle, Wash., Commissioner of Health  
Gavin J. Telfer, M.D., 703 California State Bldg., Los Angeles, Calif., District State Health Officer.

### *Laboratory Section*

- Enrique E. Ecker, Ph.D., 2085 Adelbert Road, Cleveland, O., Associate Professor of Immunology, Western Reserve University  
Katharine M. Howell, M.D., 2900 Ellis Ave., Chicago, Ill., Head of Department of Bacteriology and Serology, Michael Reese Hospital, Nelson Morris Memorial Institute  
Donna E. Kerr, M.A., 763 Hornby St., Vancouver, B. C., Canada, Assistant Director, Provincial Board of Health Laboratories  
Arthur W. Wright, M.D., 136 S. Lake Ave., Albany, N. Y., Director, Bender Hygienic Laboratory

### *Public Health Engineering Section*

- C. Fred Berghout, B.S., 757-27 St., Ogden, Utah, Statistical Assistant  
W. V. Brumbaugh, 927-15 St. N.W., Washington, D. C., Secretary, National Lime Assn.  
Lincoln Continentino, C.E., Avenida Alvares Cabral 514, Belo Horizonte, Brazil, Inspector of Sanitary Engineering, Dept. of Public Health of Minas Geraes (Assoc.)  
Archie B. Freeman, B.S., Box 482, Morehead City, N. C., Assistant Sanitary Engineer, State Board of Health

- William U. Gallaher, 306 W. Prospect Ave., Appleton, Wis., Chemist, Appleton Water Dept.  
R. H. Lefmann, City Hall, University City, Mo., Supervisor of Sanitation  
Gus H. Radebaugh, Urbana, Ill., Manager, Urbana and Champaign Sanitary District  
Edward Thornton, C.E., Box 273, Katonah, N. Y., Assistant Engineer, Department of Water Supply, Gas and Electricity of New York City

### *Industrial Hygiene Section*

- Leonidas R. Harless, M.D., Gauley Bridge, W. Va. (Assoc.)  
Edward C. Holmblad, M.D., 20 W. Jackson Blvd., Chicago, Ill., Regional Chief Surgeon, Railway Express Agency

### *Food and Nutrition Section*

- Paul L. Day, Ph.D., School of Medicine, University of Arkansas, Little Rock, Ark., Professor of Physiological Chemistry  
Conrad A. Elvehjem, Ph.D., Agr. Chem. Bldg., University of Wisconsin, Madison, Wisc., Professor of Agricultural Chemistry  
Fannie Krieger, Fairmont, W. Va. (Assoc.)  
Winifred W. Wencke, Box 456, Logan, W. Va., District Director, American Friends Service Committee

### *Public Health Education Section*

- Charles Auerbach, 49 St. & Grays Ave., Philadelphia, Pa., Manager, West Disinfecting Co.  
Vivian Drenckhahn, C.P.H., 708 Ellicott St., Buffalo, N. Y., Health Teacher, Buffalo Tuberculosis Assn.  
Rudolph H. Sundberg, M.D., 2001-4th Ave.,

San Diego, Calif., Member of staff of Rees-Stealy Clinic

## Child Hygiene Section

Helen D. Bull, M.D., 817 E. State St., Ithaca, N. Y., Professor of Parent Education, Cornell University

David Goldberg, M.D., Westwood, N. J., School Physician

Florence Houghton, 1050 Koppers Bldg., Pittsburgh, Pa., Social Worker, Koppers Coal Company.

Ethel D. Owen, M.D., 909 Hyde St., San Francisco, Calif., Supervising School Work for Prevention of Tuberculosis

Carroll E. Palmer, M.D., 615 N. Wolfe St., Baltimore, Md., Instructor, Dept. of Biostatistics, School of Hygiene and Public Health, Johns Hopkins University

## Public Health Nursing Section

Letha S. Allen, R.N., 69 Main St., Tuckahoe, N. Y., Director, Public Health Nursing Organization

Montserrat Bipol, Paris 179, Barcelona, Spain (Assoc.)

E. Pauline Bledsoe, McPherson County Red Cross, McPherson, Kans., County Public Health Nurse

Maria L. Caperochipi, Hersani 19-20, San Sebastian, Spain, Nurse (Assoc.)

Dorothy J. Carter, R.N., N.O.P.H.N., 450-7th Ave., New York, N. Y., Assistant Director

Mary A. Helterline, R.N., 42 W. Maiden St., Washington, Pa., Supervisor, American Red Cross Nursing Service

Eleanor L. Kennedy, R.N., State Bureau of Public Health, Santa Fe, New Mexico, State Supervisor of Public Health Nursing

Donna Pearce, R.N., State Dept. of Public Health, Nashville, Tenn., State Supervising Nurse

## Epidemiology Section

Elsie F. Dochterman, A.B., 611 W. 171 St., New York, N. Y., Research Assistant in Epidemiology, De Lamar Institute of Public Health, College of Phys. & Surg., Columbia Univ.

Henry C. Ricks, M.D., C.P.H., State Board of Health, Jackson, Miss., Director, Bureau of County Work and Epidemiology

P. K. Telford, M.D., 1349 Warner Ave., Los Angeles, Calif., Chief, Division of Tuberculosis, Los Angeles County Health Department

## Unaffiliated

Lars Gulbrandsen, M.D., 1853 W. Polk St., Urbana, Ill., Instructor, Department of Bacteriology and Preventive Medicine, University of Illinois.

## DECEASED MEMBERS

Prof. F. P. Gorham, Providence, R. I., Elected Member 1899, Fellow 1922.

Dr. E. M. Pickens, College Park, Md., Elected Member 1927, Fellow 1930.

Magnus W. Alexander, New York, N. Y., Elected Member 1928 (Associate).

John W. Carey, Barnhardt, Mo., Elected Member 1930.

Calvin L. Cooper, M.D., Kansas City, Mo., Elected Member 1929.

Gideon J. Ferreira, M.D., Duluth, Minn., Elected Member 1928.

J. S. Horner, M.D., W. Pawlet, Vt., Elected Member 1921.

C. Wilson Miller, Columbia, S. C., Elected Member 1928.

J. O. Skinner, M.D., Washington, D. C., Elected Member 1917.

Francis H. Slack, M.D., Coolidge Corner, Mass., Elected Member 1905.

Agnes Walker, M.D., Bolinas, Calif., Elected Member 1919.

Gordon Wilson, M.D., Baltimore, Md., Elected Member 1919.

James W. Wiltse, M.D., Albany, N. Y., Elected Member 1926.

## BACK NUMBERS OF JOURNAL NEEDED

Due to unusual demands for the July, 1932, August, 1932, September, 1932, numbers of the *Journal*, and for the January, 1933, and February, 1933, numbers, the Executive Office of the A.P.H.A. is in need of as many copies of these issues as are obtainable. It will be greatly appreciated if members who can spare these *Journals* will send them to headquarters. Those complying with this request will be reimbursed for the postage used in mailing.

## CORRECTION

In the paper, "Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity," by Elizabeth Parkhurst, on pages 903 and 906 of the September *Journal*, are two charts, above which should appear the words "Male" on the left, and "Female" on the right.

# PUBLIC HEALTH ADMINISTRATION

Pittsburgh, Pa.—The August issue of *Pittsburgh's Health* contains the first résumé of the activities of the health department which has been printed for many years. The report gives a very complete description of the organization of the department, the number employed in each service, and a numerical résumé of the activities for the past year. In Pennsylvania, vaccination against smallpox is compulsory for all school children. This service is performed by the school physician only when so desired by parents unable to pay. School physicians administer toxoid and give the Schick test. It is estimated that by the end of the year 52 per cent of the children of school age had been immunized.

New Haven, Conn.—The July *Bulletin* contains a résumé of the health conditions in New Haven for the first half of the year 1933. For the first 6 months of 1933 there was a total of 1,019 deaths compared with 945 for a similar period during the preceding year. The death rate has increased from 11.6 in 1932 to 12.5 in 1933. Influenza and pneumonia are largely accountable for the increase. An outstanding feature is the absence of any deaths from the common communicable diseases as compared to a total of 5 for 1932. Cases of diphtheria have totalled but 2 for each of the years and but 5 carriers have been found in 1933 as compared to the period in 1932 when 27 were found. A most notable feature for the 1933 period is the absence of any typhoid fever case.

Shorewood, Wis.—This residential suburb of Milwaukee, with an esti-

mated population of 14,000 in 1932, continues to be one of the honor cities in the annual Inter-Chamber Health Conservation Contest conducted by the U. S. Chamber of Commerce. The annual report contains a rather complete description of the activities of the department, well illustrated. It is reported that over 90 per cent of the school children are protected against diphtheria and smallpox and that more than 80 per cent of infants and children of preschool age have received diphtheria protection. Not a single case of diphtheria or smallpox has been reported in Shorewood during the past 3 years. It is the policy to give the Schick test to every school child before administering toxoid or toxin-antitoxin.

For the sixth consecutive year the report contains a self appraisal of the community health service. The weighted score is now 945 points in a possible 1,000. It is stated that Shorewood is penalized since it is a high grade residential suburb, but the self appraisal endeavors to make reasonable allowance for these phases of the measuring stick which cannot be applied without interpretation to non-industrial communities.

Diphtheria Protection in New York—The *Health News* of the New York State Health Department for August 7 reports that more than 1,000,000 upstate children have received either three doses of toxin-antitoxin or two inoculations of toxoid. One-fourth of the protected children were under 5 years of age at the time of inoculation. Since 1926 the number of deaths from diphtheria in New York State, exclusive of New York City, has

shown a steady decline from 250 to 59. The deaths among children under 5 years of age have been reduced from 123 to 22. To increase the number of preschool children protected requires something in addition to the usual publicity methods. The home visitation by nurses has proved productive of results.

**Hygienic Institute**—The 18th department of health report for the district comprising La Salle, Peru, and Oglesby, Ill., for the year 1932, shows a per capita expenditure of 90 cents as contrasted with \$1.41 for the previous year. A fairly large proportion of the income was derived from an endowment provided for this area with a population of 26,208. The Institute is governed by a board of 5 trustees who select the full-time medical director.

Several illustrations of coöperation

among agencies are noted. The Tri-City Tuberculosis Society closely affiliates with the Institute and furnishes a nurse, while the Institute equips the nurse with a car and directs her activities to avoid duplication. The three cities contribute to the sanitary program and two boards of education aid with the school nursing. By contract with the Metropolitan Life Insurance Company, the Institute does the bedside nursing work for policy holders. "This work coincidentally helps the Institute to register many prenatal cases, which furnishes the very beginning for public health work. This company also distributes, yearly, thousands of pamphlets valuable to public health." There is also close coöperation with the La Salle-Peru township high school, Tri-City Family Welfare Society, and relief agencies, in their various health endeavors.

## LABORATORY

### ANTIGENIC VALUE OF COMMERCIAL DIPHTHERIA TOXOIDS\*

WILLIAM LEVIN, DR.P.H., F.A.P.H.A. AND HELEN A. CARY, M.D.

*Hygienic Laboratory, State Board of Health, Portland, Ore.; and  
Medical Director, City Schools, Portland, Ore.*

THE use of toxoid in immunization against diphtheria has had wide application in the past few years, and in some communities has entirely replaced the use of toxin-antitoxin. The preference for toxoid has been attributed to its better immunizing effects and, by some, to the smaller number of injections necessary for immunization. Evidence has accumulated on the effectiveness of toxoid as an immunizing

agent. Park and Schroder<sup>1</sup> state: "The immunizing effects of our best toxoid have been better than from the best properly standardized toxin-antitoxin." Harrison<sup>2</sup> believes that toxoid is the best agent for immunizing children 6 years and under. Many other workers, both in this country and abroad are enthusiastic in their reports on the efficacy of toxoid as an immunizing agent.

There has been less agreement, however, on the number of doses as well as on the time interval between doses required for immunization. Ramon<sup>3</sup>

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 27, 1932.

uses 0.5 c.c. for the first dose; 1.0 c.c., 3 weeks later, for the second dose, and 1.5 c.c., 15 days later, for the third dose. Park recommends 3 doses of 0.5 c.c. given at weekly intervals. Most manufacturers in the United States recommend that the toxoid be given in two 1.0 c.c. doses at an interval of 3 or 4 weeks. The potency of the toxoid must be known before any conclusions can be drawn as to the size and number of doses required for immunization. Commercial toxoids now on the market specify the dosage; no information, however, is given regarding their potency.

The potency of a toxoid as expressed by its antigenic value, may be determined approximately by the Ramon flocculation test, or more certainly by the guinea pig protection test. In the former, a standardized antitoxic diphtheria serum is brought in contact in suitable proportions with the toxoid. The reaction, characterized by the formation of flocculi, may be expressed in terms of flocculating units per c.c. The determination of the potency of toxoid by the guinea pig method is required by the National Institute of Health for toxoid manufactured or to be sold in the United States. The minimum protection must be such that the initial human dose of toxoid will immunize 80 per cent of the guinea pigs in 6 weeks, so that 5 m.l.d.'s of diphtheria toxin will fail to kill in 10 days.

Ramon used toxoids of at least 10 antigenic or flocculating units per c.c. Park and his coworkers are using toxoids which average 10 antigenic units per c.c. Immunity with such toxoids has been obtained in from 94 to 98 per cent of cases. Povitzky,<sup>4</sup> in examining toxoids from different manufacturers found wide variation in antigenic values as determined by the flocculation test. Some toxoids had less than 1 antigenic unit; others from 4.2 to 7 per c.c.

To test the efficacy of several

brands of diphtheria toxoid sold in Oregon, a series of experiments was conducted which included the determination of the antigenic values of each toxoid, as well as the actual percentage of children immunized by it.

Diphtheria toxoids A, B, C, D, and E were obtained in the open market. Each lot was divided into 3 portions; one was sent to Dr. Povitzky, of the Bureau of Laboratories, New York City Health Department, for the determination of the flocculation values; one was used in the guinea pig protection tests; and one was used in the immunization of children.

The flocculation values as reported by Dr. Povitzky are given in Table I.

TABLE I  
FLOCCULATION UNITS OF COMMERCIAL  
DIPHThERIA TOXOIDS

<i>Toxoid</i>	<i>Units per c.c.</i>
A	8.9
B	3.4-3.8
C	5.8
D	Around 2
E	Around 2

The guinea pig protection tests were made in accordance with the requirements of the National Institute of Health, the only variation being that half of the immunized animals were injected with 5 m.l.d.'s and the other half with 20 m.l.d.'s of diphtheria toxin. Fifty guinea pigs of an average weight of 301 gm. were divided into 5 lots of 10 each. Each pig in the lot was injected, subcutaneously, with 1 c.c. (the initial human dose) of the toxoid under investigation. At the expiration of 6 weeks half of each lot of pigs received 5 m.l.d.'s, and half, 20 m.l.d.'s of diphtheria toxin. Four pigs died following the injection of toxoid; 1 died 40 days after injection with toxoid A; 1, 25 days; and 1, 29 days after injection with toxoid B; and 1, 40 days after injection with toxoid C. Death in all was due to pneumonia.

TABLE II

IMMUNITY CONFERRED ON GUINEA PIGS TESTED WITH 5 M.L.D. DIPHTHERIA TOXIN 6 WEEKS  
AFTER SINGLE INJECTION OF TOXOID

Toxoid	Flocculation Units	No. of G. P. Injected	Deaths in Days										Guinea Pigs Surviving	
			1	2	3	4	5	6	7	8	9	10	Number	Per Cent
A	8.9	5	0	1	0	1	0	0	0	0	0	0	3	60
B	3.6	4	0	1	0	0	0	0	0	0	0	0	3	75
C	5.8	5	0	0	0	0	0	0	1	0	0	0	4	80
D	2	5	2	2	0	0	0	0	0	0	0	0	1	20
E	2	5	0	2	1	0	0	0	0	0	0	0	2	40
Control		1	1	—	—	—	—	—	—	—	—	—	0	0

TABLE III

IMMUNITY CONFERRED ON GUINEA PIGS TESTED WITH 20 M.L.D. DIPHTHERIA TOXIN 6 WEEKS  
AFTER SINGLE INJECTION OF TOXOID

Toxoid	No. of G. P. Injected	Deaths in Days										Guinea Pigs Surviving	
		1	2	3	4	5	6	7	8	9	10	Number	Per Cent
A	4	0	1	0	0	0	0	0	1	0	0	2	50
B	4	0	1	2	0	0	0	0	0	0	0	1	25
C	4	1	0	0	0	0	0	0	0	0	0	3	75
D	5	5	0	0	0	0	0	0	0	0	0	0	0
E	5	2	1	0	0	0	0	0	0	0	0	2	40
Control	1	1	—	—	—	—	—	—	—	—	—	0	0

Tables II and III give the results of the guinea pig protection tests.

Post-mortem findings on the guinea pigs dying as the result of the toxin injection indicated that death in all cases was due to diphtheritic toxemia, except possibly in 1 of the A Group since evidence of pneumonia was found in 1 which died on the 8th day following the injection of 20 m.l.d. of diphtheria toxin.

Immunization of children with toxoid was limited as far as possible to those within the 10-year age group. It was found necessary, however to include some of a higher age group. A preliminary Schick test was given to 572 children 15 years and under, and to 88

adults, none of whom, so far as could be determined, had had diphtheria or had been immunized against it either with toxin-antitoxin or toxoid. The results are given in Table IV.

Of the 482 Schick positive reactors 467 were given the initial 1 c.c. dose of toxoid—441 children and 26 adults. Each lot of toxoid was given to approximately the same number of children. Lots A, C, and D were given to children in the Portland public and parochial schools; and lots B and E were given to those in the Salem public schools; and to children and adults in the State Institution for the Feeble-Minded, Salem.

A few children who gave a combined

TABLE IV

RESULTS OF PRELIMINARY SCHICK TEST

Age Group	Total Number Tested	Schick Positive	Per cent Non-Immune
4-5	9	8	88.9
6-10	408	363	88.9
11-15	155	85	54.8
16 and over	88	26	29.5

(protein) Schick reaction were excluded from the toxoid immunization and were given toxin toxin-antitoxin instead. Three weeks after the first toxoid injection a second injection of 1 c.c. was given. While there were a few local reactions following the injection of the toxoid, there was a marked absence of systemic reactions. This was in contrast to what followed the administration of toxoid by one of us (H. A. C.) to children without a preliminary Schick or sensitization test, when very severe local and at times systemic reactions resulted.

Three months following the second toxoid injection, the final Schick test was given. Removals, illness, and other causes were responsible for a large reduction in the number of those given the test for acquired immunity. Of 467 given the initial dose of toxoid, only 380 were available for and were given the final Schick test. Table V gives the results of the toxoid immunization in children between the ages of 5 and 15 years.

A total of 26 Schick-positive persons ranging in age from 16 to 50 years were also given toxoid B and 2 of these gave a positive Schick on the re-test. Of the 71 persons given toxoid B, 95.8 per cent were immunized. Nineteen children of the 5-15 year age group who did not get a preliminary Schick test were given two 1 c.c. doses of toxoid E, with a 3-week interval between doses; 16, or 84.2 per cent, were shown to be immune after 3 months. Twenty-eight

children in the same age group, also without a preliminary Schick test, were given two 1 c.c. doses of toxoid B with a 3-week interval between doses; 27 or 96.4 per cent were shown to be immune after 3 months.

A comparison of the antigenic values of the toxoids tested by the various methods already outlined is given in Table VI.

According to federal standards it appears that only toxoid B and C met the requirements of an 80 per cent survival against 5 m.l.d.'s diphtheria toxin. Toxoid A, with a high flocculation value, showed up poorly both in the guinea pig test and in the percentage of immunes produced in children. The manufacturers of toxoid A, stated:

This toxoid was preserved with phenol and there has accumulated considerable evidence that the phenol as a preservative at times interferes with the immunizing property of the toxoid, without affecting more than in a light degree at least the flocculating value. We are discontinuing the use of phenol as a preservative.

With the exception of toxoid A, the results show a fair correlation between the antigenic values of the various toxoids obtained with the Ramon flocculation test and with the guinea pig protection test. The latter method, however, gave a truer index of the potency as expressed in the immunity conferred on children. The recent advances made in the concentration and purification of toxoid by precipitation with alum <sup>(1, 5, 6)</sup> fortify our belief

TABLE V  
IMMUNITY CONFERRED IN CHILDREN 5 TO 15 YEARS BY TWO DOSES OF 1 C.C. TOXOID  
INJECTED AT 3-WEEK INTERVAL

Toxoid	No. of Children Re-Schicked	No. of Schick Reactors		Per cent Immunized
		Positive	Negative	
A	73	13	60	82.2
B	45	1	44	97.8
C	79	0	79	100.0
D	77	12	65	84.4
E	80	8	72	90.0



TABLE VI

COMPARATIVE ANTIGENIC VALUES OF TOXOIDS OBTAINED BY FLOCCULATION, GUINEA PIG PROTECTION AND HUMAN INJECTION METHODS

Toxoid	Date of Expiration 1933	Diluted	Flocculation Value	Guinea Pig Protection Test Per cent Survival		Per cent Children Immunized
				5 m.l.d.	20 m.l.d.	
A	May 4	Undiluted	8.9	60	50	82.2
B	May 15	1 + 1	3.4-3.8	75	25	97.8
C	May 30	Undiluted	5.8	80	75	100.0
D	June 8	1 + 3	Around 2	20	0	84.4
E	Apr. 26	1 + 1	Around 2	40	60	90.0

that the present federal minimum standards of potency are too low. The use of the flocculation test for the determination of the suitability of a toxin for the production of a toxoid is unquestioned. Our experiments, however, indicate that the flocculation value in itself is not a sufficiently reliable index of the potency of a toxoid, and should, therefore, not replace the guinea pig method. The use of both methods for the determination of the antigenic value is recommended.

A potent toxoid should be expected to give from 95 to 100 per cent immunity. One of the surprises in our experiments was the high degree of immunity conferred by toxoids of low antigenic values. Carefully controlled immunization tests on Oregon children with toxin-antitoxin by one of us (W. L.) never yielded a degree of immunity higher than 80 per cent. At the same time, it must not be overlooked that in mass immunization toxin-antitoxin may be given with impunity, whereas, in the administration of toxoid the problem of protein reactions presents itself. Unquestionably, with the attainment of a pure toxoid, that problem may be solved.

Our experiments indicate that two doses of a potent toxoid given at an interval of 3 weeks, may be expected to give a high percentage of immunes. It is interesting to note that a diluted as well as an undiluted toxoid gave good results. Park believes that if the

dosage is 0.5 c.c. (undiluted), 3 doses at weekly intervals should be given. The standards of potency of the National Institute of Health require that "the maximum human dose shall not exceed 1 c.c. of undiluted toxoid."

Further studies on toxoid, particularly on its standardization, are highly imperative. The suggestion of Schmidt of Copenhagen that the antigenic unit be termed "Immunizing Unit" is worthy of serious consideration. Once the potency of such a unit has been agreed upon and defined, the manufacturers of toxoid should be required to state on their labels the potency of their product in terms of "I. U." Until such time we must rely upon a Schick re-test 3 or 4 months after the last toxoid injection.

## SUMMARY AND CONCLUSIONS

Five commercial makes of toxoid were tested for their antigenic values by the Ramon flocculation test, by guinea pig protection tests, and by human experiment. Considerable variation in their antigenic values was found. There was fair correlation between the antigenic values of the various toxoids obtained by the Ramon flocculation test and by the guinea pig protection method, the latter method, however, paralleled more closely the results obtained in the immunization of children.

A total of 354 children between the ages of 5 and 15 were given two injections of 1 c.c. each of toxoid at a 3-week

interval. The percentage of children who became immune ran from 82.2 to 100. The results warrant the belief that a potent toxoid should give from 95 per cent to 100 per cent immunization.

Both the flocculation and guinea pig tests should be used in the determination of the antigenic value of a toxoid. The present minimum potency standards of the National Institute of Health should be raised, and steps should be taken to define and adopt a standard potency unit.

Since there is considerable variation

in the antigenic value of toxoids now on the market, a Schick re-test 3 or 4 months after the last immunizing injection is highly recommended.

#### REFERENCES

1. Park, W. H., and Schroder, M. C. Diphtheria Toxin-Antitoxin and Toxoid. *A.J.P.H.* 22, 1:7 (Jan.), 1932.
2. Harrison, W. T. Advantages of Toxoid in Diphtheria Prophylaxis. *A.J.P.H.* 22, 1:17 (Jan.), 1932.
3. Ramon, G. *Ann. de L'Inst. Pasteur*, 45, 291, 1930.
4. Povitzky, O. R. Degree of Immunization from Injection of Diphtheria Toxoid. *A.J.P.H.* 22, 1:29 (Jan.), 1932.
5. Glenny, A. T., and Barr, M. *J. Path. & Bact.* 34:131, 1931.
6. Wells, Dewey M., Graham, Arthur H., and Havens, Leon C. Diphtheria Toxoid Precipitation with Alum. *A.J.P.H.* 22, 6:648 (June), 1932.

## VITAL STATISTICS

Vital Statistics for Canada, 1932—According to a preliminary report from the Dominion Bureau of Statistics, there were 235,143 live births in Canada (exclusive of the Yukon and Northwest territories) in 1932, compared with 240,473 in 1931. The birth rate for 1932 was 22.4 (per 1,000 population); the corresponding figure for 1931 was 23.2. A marriage rate of 6.0 (per 1,000 population) was registered in 1932; in 1931, 6.4. In 1932, deaths from all causes numbered 104,190, resulting in a mortality of 9.9 (per 100,000 population)—as against 104,517 deaths and a rate of 10.1 in 1931. The 1932 death rate from all causes showed a decline of 13 per cent from the rate (11.4) recorded in 1926 when the present registration area of 9 provinces was established.

The low general mortality rate for 1932 was effected mainly through declines in such individual causes of death as tuberculosis which showed a death rate of 68 per 100,000 population in 1932 (74 in 1931); diarrhea and enteritis, 36 in 1932 (50 in 1931); diseases of early infancy, 76 in 1932 (87

in 1931); and violent deaths—63 in 1932 (69 in 1931). Fortunately the effect of the decreases in the foregoing death rates was not nullified by increased death rates in 1932 from diseases of the heart—146 per 100,000 population (132 in 1931); diseases of the arteries, 65 (58 in 1931); influenza, 40 (31 in 1931); nephritis, 54 (50 in 1931); and cancer, 95 (92 in 1931).—Tables from—*Preliminary Report of Vital Statistics of Canada, 1932*, pp. 2, 3, 10; *Preliminary Report of Vital Statistics of Canada, 1931*, pp. 3, 10.

Births by Nativity of Mother in Pennsylvania in 1932—A total of 168,553 live births was reported in Pennsylvania in 1932. Live births to native born mothers numbered 147,724, or 88 per cent of the total recorded; those to foreign born mothers totaled 20,744. There were also 85 birth certificates on which the nativity of the mothers was not stated.

During the past 10 years there has been a decided decline in the number of births to foreign born mothers in Pennsylvania. Foreign born mothers

accounted for 28 per cent of the total live births in 1922, 20 per cent in 1927, and 12 per cent in 1932; this ratio has dropped 57 per cent in the period 1922 to 1932. Of the live births to mothers of foreign nativity, 5,666 or 27.3 per cent were to those of Italian birth; 3,578 or 17.3 per cent to Austrian mothers; 2,319 or 11.2 per cent to Polish; 1,561 or 7.5 per cent to Russian; 1,443 or 7.0 per cent to Irish; 1,328 or 6.4 per cent to English, Scotch, and Welsh; and the remaining 4,829 or 23.3 per cent to German, Greek, Scandinavian and other foreign nationalities.—Pennsylvania Dept. of Health. *Vital Stat. Bull.* 8:5 (Aug.), 1933.

**Scottish Vital Statistics for 1932**  
—Reports just published show that the general death rate in Scotland for the year 1932 increased slightly over the rate of 13.26 per 1,000 population which was recorded in 1931. The rate in 1932 was 13.5. Infant mortality also increased in 1932, a rate of 86 deaths under 1 year per 1,000 births being recorded that year in comparison with 82 in 1931 and an average of 85 for the previous 5 years. However, the death rate from tuberculosis reached a record low figure of 84 per 100,000 population in 1932 as against 87 in 1931.

The birth rate in Scotland, which has been declining constantly, dropped in 1932 to a new low rate of 18.6 per 1,000 population. This is approximately half the rate (35.62) recorded in 1876, the year showing the maximum birth rate in Scotland.

In a discussion of the causes of the decline in the birth rate, it is pointed out that it cannot be explained by a diminution of the marriage rate or increase of the average age on marriage. From 1861 to 1901 the average age on marriage showed little variation—from 27.2 to 27.5 years. Since 1901 there has been but a slight increase, the average age at marriage being 27.8 in

1930. The decline in the birth rate started in 1876, while the increase in age at the time of marriage began much more recently. Moreover, the married population at the censuses of 1901, 1911, and 1921 was, as regards age, more favorably constituted for a high rate than in 1885.—*J.A.M.A.* 101:457 (Aug. 5), 1933.

**Where and How Men Get Hurt—**  
The chance of accident to the man on the street is less than is generally supposed. Out of an aggregate number of 117,477 injuries studied by the Accident and Health Department of the Metropolitan Life Insurance Company, there were only 9,078, or 7.7 per cent of the total, that happened while walking on streets and highways. The public travel accident hazard is of even less importance; for only 2.2 per cent of the injuries happened on buses, taxicabs, street cars, trains, boats, airplanes and other public conveyances. These figures relate to a group of persons who are employed in non-hazardous occupations and whose ages range between 18 and 65 years.

The vast majority of accidents occur in places which the average man seldom associates with danger—at home, in offices, in stores and in sports and games. Out of more than 117,000 injuries that were studied, close to 17,000 occurred in homes or on home premises; another 40,000 occurred within the apparently safe confines of office buildings, hotels, stores, clubs, and other public structures. Altogether, 49 per cent of all the accidents occurred inside of buildings or in private grounds where people might feel that they were comparatively safe from harm. Then, there were nearly 13,000 accidents, or 11 per cent of the total, that occurred in the common games and sports that are indulged in by the average man. These include such supposedly harmless sports as tennis, golf, skating, and even danc-

ing. Over 25,000 injuries, or 21 per cent of the total, occurred to persons riding in privately owned automobiles. The main causes of these automobile accidents were collisions with other cars, skidding, and caring for the automobiles.

A considerable number of injuries were sustained in very ordinary ways. First, missteps and falls caused nearly one-third of the total injuries. These occurred most commonly on sidewalks, on stairs, over rugs and over other objects on floors. Getting in or out of bed is hardly to be considered a dangerous activity; and yet 76 men fell and were injured in this manner. The ordinary bathtub or shower, which in the past was accused of many casualties, accounted for only 557, or less than one-half of 1 per cent. The second important group of injuries were from broken glass, nails, other sharp instruments, and splinters. These make up 18 per cent of the total. Third in order of importance, with 17 per cent of the total, were injuries by vehicles. In this class the automobile is the chief offender. Together, these three broad classes of injuries accounted for 66 per cent of the total. The remaining 34 per cent were due to being struck by falling or flying objects, to colliding with other persons or objects, to burns or explosions, to being caught in doors and windows and to a variety of other happenings.

Injuries are, for the most part, due to trivial and minor mishaps which can readily be avoided. In the aggregate, however, these preventable accidents cause an immense amount of discomfort, as well as the waste of huge sums of money because of time lost from work and the cost of medical care.—Met. Life Ins. Co. *Stat. Bull.* 14:8-10 (July), 1933.

Vital Statistics Records for New Jersey for 1932—In 1932, New Jersey

recorded a general death rate of 10.11 per 1,000 population in comparison with the rate of 10.63 recorded in both 1930 and 1931. The rate of 10.63 had previously been the lowest death rate from all causes registered in the state since the establishment of the State Department of Health.

The decline to this new low figure was aided by the 1932 death rate from typhoid fever (0.7 per 100,000 population), diphtheria (2.2 per 100,000), tuberculosis (60.6 per 100,000); and deaths under 1 year of age (49.6 per 1,000 live births)—which were the lowest rates ever recorded in the state for these individual causes of death.

Since 1912 the annual death rate from typhoid fever in New Jersey has not exceeded 10 per 100,000 population—a rate far removed from the maximum death rate of 74.3 recorded in 1882; the highest mortality rate from this disease during the past 5 years was 1.7 (1928). Diphtheria has also declined greatly. In 1888 this cause of death exacted a toll of 148 per 100,000 population; during the decade beginning with 1900, the rate declined from 48 to 25; the following decade showed a drop to 18 per 100,000; finally the figure fell to 2.2 in 1932. The 1932 death rate from all forms of tuberculosis (60.6 per 100,000) is very favorable in comparison with the rate of 90.1 which was recorded for this disease only 8 years ago.

Puerperal causes showed a death rate of 5.7 per 1,000 live births in 1932 compared with 5.9 in 1931. Deaths due to accidents in which moving automobiles were involved totaled 1,158 in 1932 as against 1,302 for 1931.

In 1932 approximately 62,250 births were recorded, equivalent to a rate of 14.6 per 1,000 population. The total number of births reported showed a decline of approximately 2,000 from the 1931 figure.—New Jersey *Pub. Health News.* 17:143-44 (July-Aug.), 1933.

# PUBLIC HEALTH ENGINEERING

## A HYPOCHLORITE FEEDING DEVICE\*

FRANK R. SHAW, ROBERT W. KEHR AND EDWIN T. MATTHEWS

*Sanitary Engineer; Assistant Sanitary Engineer; and Sanitary Engineering Assistant, U. S. Public Health Service, Chicago, Ill.*

THE principle involved in this hypochlorite feeding device is that of syphoning the hypochlorite solution from a container or containers and delivering it through a stop-cock, a capillary tube and a chlorine-resisting hose to the point of application. This principle is illustrated in the accompanying sketches of two forms of the device. Since a 2 mm. stop-cock and a  $\frac{1}{4}$ " diameter hose are used as standard practice, the size and length of the capillary tubing serves as the restriction or orifice to effect control of the flow. A wide range of flows may be established by the use of different sizes and different lengths of capillary tubing. The period of time during which the hypochlorite will flow continuously can be increased at will by using a larger container or additional like containers and connecting them by syphons.

Where very accurate administration of hypochlorite is desired, there could be installed a constant level box at a distance of 1' or more below the bottom of the container or containers. Under such an arrangement, the contents of the hypochlorite container or containers would be syphoned to the constant level box by means of an unrestricted  $\frac{1}{4}$ " diameter hose attached to a float valve on the constant level box. From the constant level box the hypochlorite

would flow to the point of application through the 2 mm. stop-cock, the proper capillary tubing and the necessary  $\frac{1}{4}$ " hose. In this case, the total head would be measured from the surface of the hypochlorite in the constant level box. It should be borne in mind that the constant level box and all of its working parts must be made of materials non-corrosive to chlorine, such as glass, hard rubber or sterling silver.

### TECHNICAL FACTORS

The device, without the provision of a constant level box, was originally developed for use in super-chlorination and in connection with filtration and activated carbon chlorine removal. With such an application, one would not be concerned about the concurrent reduction of flow due to the ever increasing syphon lift as the hypochlorite container emptied; but would simply arrange for the desired chlorine dosage under the conditions of the lowest rate of flow. It is obvious that the reduction in flow is a function of the total head under which the apparatus is working. Calibration of various lengths of various sizes of capillary tubing under different heads indicated the per-

TABLE I

Total Head	Per Cent Decrease in Flow
3'	22
5'	13
8'	6
12'	4
17'	3

\* To be read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

centages of decrease in flow from a 5 gal. pyrex bottle between the first 1,000 c.c. and the last 1,000 c.c. (Table I).

These figures suggest the desirability of operating under a head of 5' or more so as to minimize the decrease in the rate of flow. These figures also warrant the opinion that the application of the device need not be limited to use in conjunction with activated carbon dechlorination, especially when operated under heads of from 5' to 17' or more. For a 0.5 p.p.m. minimum dose, there would be created a maximum dose of 0.515 p.p.m. under a 17' head; 0.52 p.p.m. under a 12' head; 0.53 p.p.m. under an 8' head and 0.565 p.p.m. under a 5' head.

When the device operates under gravity flow the total head is the distance from the surface of the hypochlorite in the container to the upper end of the capillary tubing. When the hypochlorite is applied to the suction of a pump the total head is the static suction lift of the pump plus the friction losses in the pump's suction pipe, plus the distance from the top of the capillary tubing to the surface of the hypochlorite.

The time required to empty the hypochlorite container is governed by the capillary tubing. In every case the hours of flow are determined by the period of time desired between recharging of the hypochlorite container. In the case of a pump operating 5 hours each day, a capillary tube of such size and length would be selected as to require 5 hours or slightly more to empty the hypochlorite container under the particular head which pertains to the problem.

To establish a guide for the selection of the proper size and proper length of capillary tubing, certain lengths of the several sizes of capillary tubing were calibrated as to time while flowing under certain heads. The water used in this calibration was Chicago City water

which is unfiltered Lake Michigan water and therefore high in its plankton content. The results of this calibration for 5 gal. of water appear under the heading of "Hours of Flow." With filtered or well water and a clear hypochlorite solution, longer hours of flow might be established by using  $\frac{1}{2}$  mm. capillary tubing.

From this tabulation, it is easy to select the size and length of capillary tubing for any particular installation or from it determine the number of 5 gal. units needed to establish the time of flow desired. If the total head, either by gravity flow or pump suction, is 8' and it is desired to have a 5 gal. bottle last 4 hours, then one has the choice of a 4" length of  $\frac{3}{4}$  mm. or a 15" length of 1 mm. capillary tubing. If an 8 hour flow is desired under the same conditions, then a 10 gal. container or two 5 gal. containers connected by a syphon would be installed.

A container of any size may be used in connection with a constant level box and without such a box where the percentage reduction in flow is not a factor, such as where chlorine taste is not objectionable or where the chlorine is removed by activated carbon. If the depth of the hypochlorite in the container is no greater than the depth of the hypochlorite in a 5 gal. pyrex bottle then the above percentages of reduction in flow would hold true regardless of the quantity of hypochlorite involved. If the depth of the hypochlorite is appreciably greater than that in a 5 gal. pyrex bottle then a greater percentage of change in flow will occur.

The temperature of the water used in the calibration of the capillary tubing was between 19° C. and 22° C. It was thought that the temperature of the liquid may have a noteworthy influence on the flow. Tests under different heads and under water temperatures as high as 40° C. revealed an average increase

chlorite and effecting a dose of 0.5 p.p.m., flows of from 915 to 5,500 gal. per minute under heads of 3' to 17' respectively may be treated for periods of time of 27 hours and 4.5 hours respectively with one 5 gal. container. Of course it is obvious that with regular treatment over a considerable part of a day there is a rate of flow beyond which it would not be economical to use hypochlorite.

#### FORMULA FOR COMPUTING QUANTITY OF HYPOCHLORITE

H. Number of cubic centimeters of hypochlorite needed for each charging of the hypochlorite feeder

G. Rate of flow to be treated in gallons per minute

T. Time of flow from hypochlorite container in hours

d. Desired chlorine dosage in parts per million (pounds per million pounds)

p. Percentage strength of hypochlorite stock solution to be used, expressed as a decimal.

$$0.22712 \times G \times T \times d$$

$$H = \frac{\quad}{p}$$

#### CONVERSION TABLE

1 gallon	=	3,785.4 c.c.	=	128 fluid ounces
1 quart	=	946.4 c.c.	=	32 fluid ounces
1 pint	=	473.2 c.c.	=	16 fluid ounces
1 gill	=	118.3 c.c.	=	4 fluid ounces

#### DESCRIPTION OF THE HYPOCHLORITE FEEDER

For the purpose of identification the initials SKM have been assigned to this device. Two types of the device have been developed, one known as the SKM-1 and the other as SKM-2.

An illustration of each type appears elsewhere.

**SKM-1**—The SKM-1, which involves the syphoning of the hypochlorite solution from a 5 gal. bottle or carboy, was designed primarily for use on steamships where the rolling and pitching of the vessel required that the hypochlorite container be all enclosed. It also has a feature by which the syphon can be started by means of an air pressure bulb.

This type is also especially applicable where the rate of flow is sufficiently small to permit the measuring of the hypochlorite stock solution to be introduced into the bottle by means of a graduated 125 c.c. or 250 c.c. separatory funnel.

The equipment needed for this device is standard laboratory ware and may be secured from any large dealer. However, for purposes of identification, the numbers appearing in Catalogue C-227 of the Central Scientific Company, 460 Ohio Street, Chicago, Ill., and elsewhere, are given. The index letters appear on the illustration.

#### LIST OF EQUIPMENT—HYPOCHLORITE FEEDER SKM-1

*From Central Scientific Company (or other dealer)*

Numbers refer to catalogue C-227

A. Rubber stopper, one hole, to fit half-way into funnel "B." #11572B

B. Funnel, separatory, pyrex, cylindrical, etc., 250 c.c. capacity. #6161

C, D & E. Glass tubing, combustion, pyrex, std. wall, 8 mm. outside diameter, bent as follows: #7206X

	Short Leg	Long Leg	Diameter of Bend
C. (L tube)	2"	2"	3/4"
D. (U tube)	1"	2"	3/4"
E. (U tube)	1"	20 1/2"	3/4"

F. Rubber tubing, black, pure gum, heavy wall. #11596-1/4"

G. Rubber stopper with 4-7 mm. diameter holes on right angles axes 3/16" clear of edge of smaller side. #11572A X Size 12

H. Bottle, pyrex glass, narrow mouth, 5 gal. #1604

J. Tube, connecting, glass, T-shape, O.D. 3/16". #14006A

K. Rubber bulb with metal valve for pressure only. #11530

L. Stop-cock, pyrex glass, straight bore of 2 mm. #12909

N. Glass tubing, capillary, pyrex, gauged accurately both ends of size and length for particular installation. #7203 (Purchaser should select from tabulation of hours of flow under different heads.)

O. Cylinder, graduated in 1 c.c., capacity 100 c.c. #3659KA

P. Color comparator tube, Nessler, A.P.H.A.

Std., tall form with rubber stopper to fit. #3026B

Q. Pipette, 1 c.c. capacity, graduated in tenths. #10506KC

R. Beaker, pyrex glass, usual tall form with lip, 300 c.c. capacity. #1136

S, T, U, V & W. Lamotte Enslow Comparator parts. (Central Scientific Co.)

S. Ampule of distilled water

T. Ampule of 0.2 p.p.m. color std.

U. Ampule of 1.0 p.p.m. color std.

V. (3) Test tubes for set.

W. 100 c.c. orthotoluidine (use 0.5 c.c. for test)

O. Cylinder, graduated in 5 c.c., capacity 500 c.c. #3659KA

P, Q, S, T, U, V & W. Same as indicated for SKM-1

#### *From Most Convenient Source*

Y. Ten gal. crock

Z. Chlorine resisting hose, medium wall,  $\frac{1}{4}$ " inside diameter

NOTE: There should be purchased at the outset an extra or spare of all glass and earthenware parts, four to six pieces of capillary tubing of the size and length needed, and the proper length of hose "Z" to reach the point of application.

#### *From Most Convenient Source*

Z. Chlorine resisting hose, medium wall,  $\frac{1}{4}$ " inside diameter

NOTE: There should be purchased at the outset an extra or spare of all glass and earthenware parts, four to six pieces of capillary tubing of the size and length needed, 12' of hose "F" and the proper length of hose "Z" to reach the point of application.

**SKM-2**—The SKM-2, which involves the syphoning of the hypochlorite solution from one or more 10 gal. crocks, was designed for those cases where the device would not be subject to motion and where a considerable flow of water is treated and a large quantity of the stock solution of hypochlorite is introduced into the hypochlorite feeder. Where more than a 10 gal. quantity is required to establish flow for the entire period of treatment, two or more 10 gal. crocks may be connected together by syphons. The equipment needed for the SKM-2 is as follows:

#### *From Central Scientific Company (or other dealer)*

Numbers refer to catalogue C-227

A. One-half gal. glass funnel. #6126

B. Glass tubing, combustion, pyrex, std. wall, 8 mm. outside diameter, #7206X, bent in U-shape with short leg 1", long leg 20" and diameter of bend 3"

C. Stop-cock, pyrex, straight bore of 2 mm. #12909

D. Glass tubing, capillary, pyrex, gauged accurately both ends, of size and length for particular installation #7203. (Purchaser should select from tabulation of hours of flow under different heads.)

#### ASSEMBLY AND OPERATION

The glass tubing extending from the stop-cock should be cut off at a distance of 2" from the center of the stop-cock. Where a regular gauge glass cutter is not available the cutting may be done by filing a slight groove entirely around the tube with a triangular file and then bending it at this point. Withdraw the core of the stop-cock and with a toothpick, wire or the like, remove any vaseline in the holes. If the vaseline on the ground surfaces of the core or socket does not appear to be fresh, remove it and apply fresh vaseline. The core should be cleaned and resurfaced with fresh vaseline periodically, once a week or once a month. If the core becomes "frozen" (stuck) release it by immersing in warm water for a short period of time. Tube "P," when filled with vinegar, is intended for use in soaking the capillary tubes to remove any calcium deposit. Vinegar may also be used to clean other parts of the feeders.

In the case of SKM-1, 5 c.c. graduations may be established on the funnel "B" by shellac and lines of paint, or by strips of tape at the points determined by measuring accurately the different quantities of water in cylinder "O" and then pouring it into the funnel. One c.c. equals 1 ml. Insert the glassware into rubber stopper "G" by wetting both the tube and the hole



with water. Push the tube into the stopper on a straight line, or turn the tube clockwise and counter-clockwise only slightly and easily if found necessary. In the event of gravity feed, the syphon is started by holding a finger over the outlet of tee tube "J" and compressing the air with bulb "K."

In the case of SKM-2, syphon tube "B" is held in place by attaching a cleat or wrapping friction tape about the tube at the proper point so as to suspend it correctly. The weight of the delivery line "Z" should be carried by a cleat or friction tape on the shelf and not on the syphon tube "B." For gravity flow the syphon is started by filling the delivery hose from the stopcock to the point where the hose is attached to tube "B."

The hypochlorite feeders must be operated on the basis of an orthotoluidine color test at the beginning of each day's operation. New color standards should be purchased every 6 months.

#### THE ORTHOTOLUIDINE COLOR TEST

1. Fill two test tubes "V" to the mark with the water to be tested.
2. Draw from bottle W into pipette "Q" a sufficient quantity of orthotoluidine nearly to fill the pipette. Lower the orthotoluidine in the pipette to the zero mark, returning all surplus orthotoluidine to the bottle as it is expensive. Introduce 0.5 c.c. of the orthotoluidine into one of the test tubes containing the water.
3. Mix the orthotoluidine and the sample of water by placing the thumb over the test tube and inverting it several times. Allow to stand for 2 minutes.
4. Place the orthotoluidine treated sample in front of the distilled water sample "S" and the untreated sample in the rear of the color standard "T" or "U." Hold them opposite good light and observe the color by looking through them from the side.
5. The chlorine dosage is determined by making the test immediately after the chlorine is introduced and the chlorine residual 15 minutes after the chlorine is introduced. The latter should always be at least 0.2 p.p.m. The amount of chlorine needed to

produce this residual at the end of 15 minutes is dependent upon the chlorine absorbing matter in the water. With waters relatively free of such matter a dose of 0.5 p.p.m. will produce a 0.2 p.p.m. residual, whereas waters high in such matter may require 0.8, 1.0, or a higher dosage in p.p.m. Where dechlorination is being effected with activated carbon a dose of not less than 1 p.p.m. should be applied or rather a residual of at least 0.5 p.p.m. just before contact with the carbon should be produced.

#### COST OF HYPOCHLORITE FEEDER

In August, 1933, the cost of single units with duplicate glassware (except the orthotoluidine set), 6 capillary tubes, 12' of black gum rubber hose and 12' of red chlorine resisting hose was, as follows: SKM-1, \$33.44; SKM-2, \$19.86.

#### HOURS OF FLOW

FIVE GALLONS OF LAKE MICHIGAN WATER THROUGH CERTAIN LENGTHS OF CERTAIN SIZES OF CAPILLARY TUBING UNDER DIFFERENT HEADS

Head	Size of Tubing in Feet	in Milli- meters	Length of Capillary Tubing					
			3"	6"	9"	12"	15"	18"
3	3/4		7.6	11.5	15.5	19.4	23.3	27.1
	1		4.0	5.8	7.6	9.4	11.1	12.9
	1 1/4		1.9	2.3	2.8	3.2	3.7	4.1
	1 1/2		1.6	2.0	2.4	2.9	3.3	3.7
	1 3/4		1.4	1.6	1.8	2.0	2.3	2.5
5	3/4		5.1	7.0	8.9	10.7	12.6	14.4
	1		2.6	3.6	4.5	5.5	6.4	7.4
	1 1/4		1.6	1.8	2.0	2.1	2.3	2.5
	1 1/2		1.4	1.6	1.8	2.0	2.2	2.4
	1 3/4		1.0	1.2	1.3	1.5	1.6	1.7
8	3/4		3.7	4.7	5.7	6.7	7.8	8.8
	1		2.1	2.5	3.0	3.5	4.0	4.5
	1 1/4		1.1	1.3	1.6	1.8	2.0	2.3
	1 1/2		1.0	1.2	1.4	1.6	1.8	2.0
	1 3/4		0.8	1.0	1.1	1.2	1.3	1.4
12	3/4		2.9	3.5	4.1	4.8	5.4	6.0
	1		1.8	2.2	2.5	2.8	3.2	3.5
	1 1/4		0.9	1.1	1.3	1.5	1.6	1.8
	1 1/2		0.7	0.9	1.1	1.2	1.4	1.5
	1 3/4		0.7	0.8	0.9	0.9	1.0	1.1
17	1/2 *		4.3	5.9	7.5	9.0	10.6	12.2
	3/4		2.6	3.0	3.4	3.8	4.1	4.5
	1		1.6	1.9	2.2	2.4	2.7	2.9
	1 1/4		0.8	0.9	1.0	1.2	1.3	1.4
	1 1/2		0.7	0.8	0.9	1.0	1.1	1.2
	1 3/4		0.5	0.6	0.7	0.8	0.8	0.9

\* Distilled water

## INDUSTRIAL HYGIENE

Dr. J. A. Orenstein Honored—

At the sixth annual scientific meeting of the Medical Association of South Africa (British Medical Association) which was held in the University Buildings, Groote Schur, from September 25 to 30, the Association's gold medal for meritorious services was presented to Dr. J. A. Orenstein. (Our readers will be interested to know that Dr. Orenstein is a Charter Fellow of our section on Industrial Hygiene, having joined when he was with Dr. William C. Gorgas in the Panama Canal Zone, nearly 20 years ago.)—*Science* 2017:165 (Aug. 25), 1933. E. R. H.

### Incidence of Illness Among Male Industrial Employees in 1932 as Compared with Earlier Years—

In a study of 40 industrial establishment sick benefit funds for 1932, as a whole the frequency of cases of disabling sickness lasting 8 days or longer, among a sample group of male industrial employees, differed little from the incidence recorded for the preceding year. In each of the past 3 years, in fact, the sickness rates for this group have exhibited remarkable stability at a lower incidence level than during the 1927-1929 period.

For certain causes of disability, however, greater changes in frequency may be noted. The respiratory disease rate was higher in 1932 than in either of the 2 immediately preceding years, due chiefly to an unusual prevalence of influenza in March and again in December, 1932.

Although the influenza rate was higher in 1932 than in 1931, there was no increase in pneumonia.

As has been pointed out in previous

communications, these sickness rates are based on the reports of a group of about 40 industrial establishment sick benefit funds, and apply in the main to employed men, although many work only on a part-time basis. For information concerning the health of the unemployed, other data obviously are required.—Dean K. Brundage, *Pub. Health Rep.* 48, 30:869-871 (July 28), 1933. E. R. H.

Correspondence Committee on Industrial Hygiene—Some fifteen members of the Correspondence Committee on Industrial Hygiene met at the International Labour Office July 3 to 5, 1933.

The meeting examined the draft of the forthcoming *Grey Report* relating to the extension of the list of occupational diseases contained in a Schedule to the International Convention on this subject, with special reference to the conclusions of the report relating to silicosis. After some discussion these conclusions were formulated in accordance with the views of the experts.

The meeting also drew up a formula for certain forms of poisoning to be added to the list of diseases giving rise to compensation; these included the halogen derivatives of the fatty series. In the course of the discussion on silicosis the meeting decided on the proposal of Dr. Bridge, to recommend that a study be made of the possibility of including fibrosis due to asbestos dust in the list of occupational diseases giving rise to compensation.

The meeting examined various questions of industrial hygiene which it decided to place on the agenda of the next meeting. These included medical in-

spection of factories, medical supervision in the factory, the study of work of a light, medium, and heavy character, the nutrition of workers, an inquiry into the health of hat makers, etc.—*Indust. & Lab. Inf.* 47, 3:119 (July 17), 1933.

E. R. H.

**Health Hazard from Dust in the Mines and Allied Industries of the United States—Initial Survey of the Extent and Severity**—A brief historical review is followed by a listing of the various public and private agencies, and their duties, in regard to the subject of the title. Dissemination of information is not only from these agencies but from the technical press, the International Labour Office, and manufacturing concerns. The present day makes an interesting comparison with the beginnings of a movement 25 years old.

The extent and severity of dust diseases is shown with tables, in connection with metal mining (including mills), coal mining (including washing), smelting and refining (non-ferrous), smelting (ferrous) and the manufacture of cement.

While no grand totaling is given of the numbers of workmen exposed to the dust hazard in the various industries, the separate totals are sufficient to indicate the wide extent of this kind of hazard.

There is no reason to think that human ingenuity and care will not develop methods of prevention or removal, even as it has done in aerial and gas warfare.

It seems a fair guess that, as metals and minerals become scarcer, the comminution of lower grade ores and rocks, largely siliceous, will increase the quantity of dust produced, since about 60 per cent of the earth's crust is composed of silica. It is evident that humanity has been exposed in some degree to the dust hazard for some little time, and

that it probably has developed a certain constitutional immunity through the ages that will carry it past this hazard. The paper is intended for discussion.—M. Van Siclen, Amer. Inst. of Min. and Metal Eng. (29 West 39th Street), New York, N. Y., *Contribution No. 45*, Aug., 1933, 13 pp.

E. R. H.

#### The Size Frequency of Industrial Dusts—Author's summary:

The results of measurements of 18,000 outdoor dust particles showed that nearly all of these are less than 1 micron in average diameter. The median size was found to be 0.5  $\mu$ . In contrast with this result it was found that only 21 per cent of about 6,000 industrial dust particles were less than 1  $\mu$  in size, the majority (69 per cent) being between 1 and 3  $\mu$ . The median size of the industrial dust particles was found to be 1.5  $\mu$ . These results clearly indicate that in conducting industrial dust studies our concern should be only for those particles ranging in size from 0.5 to 5  $\mu$ .

The instrument used in sampling industrial dust in air, the standard impinger apparatus, is shown to be capable of collecting, with a high degree of efficiency, dust particles of the sizes found in this study. The standard method used in enumerating dust particles is shown to take into account about 85 per cent of the dust present in industrial atmospheres. In addition, our studies have shown that a high correlation exists between dust counts obtained with our technic and the degree of silicosis and tuberculosis found in a study of health of granite cutters. The present study clearly indicates that the method used in enumerating dust particles collected by the impinger apparatus constitutes a valuable and practical index of the hazardousness of dust inhalation.—J. J. Bloomfield, *Pub. Health Rep.* 48, 32:961-968 (Aug. 11), 1933.

E. R. H.

**Some Common Industrial Health Hazards**—An occupational disease is an affliction which is the result of exposure to an industrial health hazard, while an industrial health hazard is any condition or manner of work that is unnatural to the physiology of the human being so engaged.

Author's summary follows:

1. It requires industrial health hazards to produce occupational diseases. Therefore, data on occupational diseases help to define such health hazards.

2. Standardization of reporting forms is advised as well as laws requiring the reporting of occupational diseases, irrespective of compensability.

3. It is considered that among the commonest industrial hazards are the following, which are discussed in some instances with statistics:

(1) The poisons—particularly lead, volatile solvents, and irritants including corrosives.

(2) Fatigue—which even in a period of depression is still a matter of unrestricted hours, night work, child labor, female labor, and a consideration of strain of bodily parts, particularly noticeable as tenosynovitis.

(3) Dust—which at present involves chiefly silica and silicates used extensively in various industries and requires common sense methods of control before refinements in certain particulars.

(4) Air conditions—which hinge upon the subject of temperature, atmospheric cooling power, and effective radiation, the latter of which is stressed both because it is a rather new discovery in physiological relationships and because it is often of the greatest importance in comfort and efficiency.

Various precision instruments for determining air conditions were demonstrated (described in the discussion).—Emery R. Hayhurst, paper before International Assn. of Industrial Accident Boards & Commissions, Columbus meeting: *U. S. Labor Bull.* 577:190-205, 217-224 (Apr.), 1933.

E. R. H.

**The Silica Content of Lungs**—The author refers first to the chemical analysis of post-mortem lungs from coal miners and associated workers, 35

all total, in South Wales, which he published in collaboration with Professor Lyle Cummins in 1930 in the *Journal of Pathology & Bacteriology* (33: 1095).

The present report consists of the analysis of 60 cases which are divided into 6 groups, depending upon the percentage of silica found in the dried lung substance. These percentages ran from less than 0.3 per cent to a total silica exceeding 2.4 per cent of dried lung substance. The author points out that of all dusts to which industrial workers may be exposed, "coal dust" in the mines is the most concentrated. This coal dust contains 0.6 per cent or more of siliceous matter which might amount to 50 particles of the same per c.c.

The Australian and South African workers have agreed that the "danger limit" for the purer forms of silica is 200 particles per c.c. Thus it would appear quite possible for a coal miner to inhale as much as 2 mg. of actual silica during a day's work. Working 250 days a year, 0.5 gm. of silica might reach the lungs in a year and in 10 years as much as 5.0 gm. could be inhaled.

In a study of the lungs of 24 coal miners whose deaths were due to accident or illness and not especially to lung fibrosis, analysis showed an average of 4.1 gm. total silica in the lungs of each man (1.15 per cent of the dried lung). Their total time of exposure to mine dust varied from 20 to 50 years. Thus an important proportion of silica inhaled must have been disposed of by drainage, or excreted. Nevertheless, an ordinary coal miner may acquire progressive damage to the lymphatic drainage so that after age 50, a damage to the lungs from the silica fraction may assume serious proportions. Experience among the Welsh coal miners certainly indicates 50 to 53 years as the "critical age" in this respect.

Coal dust alone, apart from silica,

cannot be regarded as a cause of serious fibrosis of lungs, and such minimal fibrosis as does occur in this class of worker can be explained as due to the action of traces of siliceous dust present even in high-grade "pure" coal.

Collins and Gilchrist (*J. Indust. Hyg.* 1928:101) have shown that coal miners have an excessive mortality rate from pneumonia and bronchitis.

The conclusion is that when the silica content of the lungs exceeds 1 per cent of the dried lung substance, the resulting fibrosis clearly contributes toward death. When the silica content exceeds 1.6 per cent the associated fibrosis is sufficient in itself to lead to death.—A. F. Sladen, *Lancet*, 5733:123-125 (July 15), 1933. E. R. H.

Review of Silicosis—The author's article appears serially in the *New York Industrial Bulletin* in February, April, June, and July, 1933. Subjects of discussion are: Part I, Definition of silicosis; chemical properties of silica; Part II, Exposure to silica dust in industry; factors in the development of silicosis; silicosis abroad; silicosis in the United States (by industries); summary of hazardous industries; silicosis in New York State; Part III, Symptoms and course of silicosis; physical signs, complications of silicosis, X-ray appearances. — Adelaide R. Smith, *Indust. Bull.*, Dept. of Labor, 12, 32-33, 90-92, 144-146, 176-178, 1933. E. R. H.

Court Decisions—Bronchitis, aggravated by exposure to inhalation of gas and smoke to result in steady coughing, is an occupational injury compensable under the Massachusetts law.—Massachusetts Supreme Judicial Court.

A man employed on construction work died from sunstroke while working overtime in the sun on a hot day. Compensation to the widow was denied;

but, upon appeal, the ruling was reversed and compensation awarded on the ground that the workman was exposed to a far different hazard than the public generally.—New Jersey Court of Errors and Appeals.

An employee was in a camp at a training school for salesmen. One night a severe storm blew down his tent and he was drenched and caught a cold which developed into acute arthritis, necessitating hospitalization. Compensation was denied; but upon appeal the decision was reversed and the case was remanded with directions to award compensation.—New York Appellate Division.—*Bull. Assn. of Cas. & Sur. Ex.*, 34:20, 22 (July), 1933. E. R. H.

Compensation for Silicosis—Data published in the "Sixth Annual Report of the Workmen's Compensation Commission of New South Wales" (pp. 53-57) indicate that the cost and expense of compensating for silicosis, in special occupations in the County of Cumberland, under "Workmen's Compensation (Silicosis) Scheme 1," from September, 1927, to April, 1932, have averaged about 6 per cent of wages.—*Bull. Assn. of Cas. & Sur. Ex.* 34:13 (July), 1933. E. R. H.

Bite by Infected Wood Tick Held Compensable—A traveling salesman employed by The Boise Grocery Company traveled through a tick infested area doing his regular duties. While extricating his car from a mud hole, a wood tick embedded itself in his right leg (March 27, 1932). On March 31 he also found a tick bite on his left shoulder. He was taken sick a few days later, entered a hospital in Boise on April 5 and died of Rocky Mountain spotted fever 11 days later.

The Supreme Court of Idaho upheld the Industrial Accident Board in making an award to the widow with the

statement that the highways he traveled, the hotels he stopped at, and the stores he visited became and were his workshop; they were the places where he constantly spent his time and worked for his employer. . . . Consequently, the deceased was exposed to the danger of being bitten by an infected wood tick in a greater degree than those who lived in the wood tick territory and traveled over the highways traversing it.—*Month. Labor Rev.* 37, 2:314 (Aug.), 1933. E. R. H.

**Workmen's Compensation Act Held Not to Take Away Right of Action for Noncompensable Disease Caused by Employer's Negligence**—The West Virginia Supreme Court of Appeals in the *Jones v. Rinehart & Dennis Co., Inc.* (168 S. E. 482), decided it seemed clear that an employee had a right of action at common law for diseases arising out of his employment through the negligence of his employer, and that, if such right of action had not been taken away by the compensation act, the administratrix of the decedent in the instant case had the right to prosecute the action under the statute relating to death from a wrongful or negligent act.

Recurring to the query as to whether the above quoted statutory provision exempted an employer, who was protected by the compensation act, from liability for a wrong to an employee arising from a disease contracted in the course of his employment through the negligence of his employer, even though the disease was not compensable under the compensation statute, the court said that it was "difficult to perceive a satisfactory and reasonable basis for exemption of employers from liability for disease caused by their negligence, such disease being noncompensable under the compensation statute," and declared that "we are of opinion that it was the legislative intent, as expressed in our

compensation law (Code 1931, 23-2-6, Code 1932, sec. 2516), to exempt employers from liability for damages at common law or by statute for compensable injury or death of employees, however occurring, but not to exempt from liability for noncompensable disease (caused by negligence of the employer) or death resulting from such disease."—*Pub. Health Rep.* 48, 26: 764-766 (June 30), 1933.

E. R. H.

**Occupational Dermatitis and Compensation**—The author gives tables to show dermatitis classified according to decision of referee, to length of disability and disposition of cases, to parts affected and disposition of cases, to causative agent and disposition of cases—the whole with accompanying discussion.

In all, 520 claims for occupational dermatitis were heard during the 18-month period covered in the report. Of these, 240 or 46 per cent were disallowed, and 182 or 35 per cent received awards. More than half of the disallowed cases were so disposed of because the disability did not exceed 7 days, or the claimant failed to appear, or the disease was not contracted in the course of employment, or for similar reasons. Since the law does not give complete coverage for all forms of industrial dermatitis, the only remedy is to change the law to cover "any disease proved to be due to the claimant's employment."—Freda S. Miller, *New York Indust. Bull.* 12, 3-4: 60-61, 84, 88-89, 94 (Mar. and Apr.), 1933.

E. R. H.

**What Determines Compensability for Skin Diseases Among Industrial Workers?**—Discussion is given at length concerning the differential diagnosis of occupational dermatoses, the function of patch tests, the importance of history of previous skin affections,

sensitization and allergy, complications of industrial dermatitis with relation to industrial compensation, and a suggestive course of action for compensation bodies.

The latter subject of discussion (course of action) is of particular interest as a guide for compensation purposes and should be read in the original. In connection with his paper Dr. McCord demonstrated, with the assistance of Mr. Wiley, some examples of patch tests. A valuable discussion follows.—Dr. Carey P. McCord, paper before Internatl. Assn. of Industrial Accident Boards & Commissions, Columbus meeting. *U. S. Labor Bull.* 577:205-217, 217-224 (Apr.), 1933.

E. R. H.

**Compensation for Occupational Diseases in Denmark**—The Danish Act of May 20, 1933, relating to compensation for industrial accidents, which will come into force on October 1, 1933, provides also for compensation for a number of occupational diseases.

These include, in addition to those covered by the Convention on this subject adopted by the International Labour Conference in 1925 (lead poisoning, mercury poisoning and anthrax), chronic and recurrent skin diseases due to exotic woods, and lung diseases due to inhalation of dust from stone and ores in eight specified industries. The Act does not cover skin diseases caused by certain products which were included in the original Bill.—*Indust. & Labour. Inf.*, 47, 1:41 (July), 1933.

E. R. H.

**A Modern Plan for a Community Campaign Against Air Pollution**—The author considers air, water, and food purity equally important. The discussion concerns smoke regulation, a survey of atmospheric pollution—soot-fall, air-borne solids, sulphur dioxide,

natural sunshine, other meteorologic data, and an inquiry concerning the causes of pollution, with a brief word on legislation and economic applications.

City dwellers have a right, as a matter of public health, to expect the standard of air purity will be brought up to a parity with that already fixed for water and food; that the rôle of leadership in this movement belongs to the medical profession; that current conditions are unusually favorable for campaign success; that a workable plan of campaign would help immediately to reduce unemployment, spur scientific research, aid infant industries and assist in the restoration of real estate values.

"In conclusion, be assured that in connection with whatever action you may take you are free to call upon Mellon Institute of Industrial Research for any assistance it may be able to give, in the light of its 20 years of scientific investigation of the problems of air pollution."—H. B. Meller, *Am. J. Med. Sc.* 737:157-165 (Aug.), 1933.

E. R. H.

**Temperature Gradient Observations in a Large Heated Space**—The authors investigated the temperatures at various levels in the field house at the University of Wisconsin. The description of the heating and ventilating system is given. Excerpts from the conclusions follow:

Under gravity circulation and near zero outside temperature conditions, a temperature gradient of about  $\frac{3}{4}^{\circ}$  per foot was found for the first 15 ft. of elevation and about  $1/10^{\circ}$  per foot from 15 ft. to 97 ft. at the peak of the roof.

A fan system is considered desirable in this type of building in order to reduce humidity by the introduction of outside air and at times to remove the heat from the audience.

It is considered safe and desirable in

this type of a building that the designer use the temperature gradient observed under gravity circulation rather than any found with fan recirculation.—G. L. Larson, D. W. Nelson, and O. C. Cromer, *Heating, Piping and Air Conditioning*, Sept., 1933, pp. 477-485.

E. R. H.

### Zinc in Relation to General and Industrial Hygiene—Authors' summary:

1. In 1925, a publication of the Public Health Service (*Reprint 1029*) placed a limit of 5 p.p.m. of zinc in drinking water. This limit has been applied freely to many conditions in which zinc is ingested. Since the zinc is not of itself poisonous, and many times 5 p.p.m. may be taken without harmful effects, it is suggested that this limit, which gives a relatively innocuous metal an undeserved reputation for toxicity, be increased or done away with altogether.

2. Foods or beverages, with the exception of simple or chlorinated drinking water, should not be stored in zinc-lined or galvanized containers. Acid drinks and foods will invariably cause solution of zinc and the formation of simple compounds of zinc which irritate the stomach and may cause vomiting.

3. A single industrial condition arises from zinc and this condition is not produced by zinc alone. This is the "zinc chill," better known as metal fume fever. The different groups of symptoms described as chronic industrial zinc poisoning, together with other complex ills which have been ascribed to zinc, may be disregarded, as they are due to contamination by other substances.—Cecil K. Drinker and Lawrence T. Fairhall, *Pub. Health Rep.* 48, 32:955-961 (Aug. 11), 1933. E. R. H.

**Lead Absorption and Compensation**—The author distinguishes between lead absorption and lead poisoning. In an examination of 381 lead workers, 149 presenting a clinical picture suggestive of lead absorption and laboratory tests confirmed the diagnosis in approxi-

mately two-thirds of these. In the remaining one-third, it was considered that the symptom-complexes present were probably due to other causes. None of these workers were incapacitated. In lead absorption workers may be apparently healthy and have no complaints. Hence they present no problem because there is no disability but they demand general prophylaxis and prevention of acute lead poisoning.

Compensation cases are those where disability is actual or claimed. In acute cases the diagnosis can usually be made with a sufficient degree of certainty. In the subacute cases the difficulties of diagnosis on the basis of the clinical picture alone are obviously very great. Thus constipation, severe headache, or abdominal pain may or may not be due to lead poisoning. The probability that lead exposure is a cause would appear to be approximately (from the above) two to one. Here careful laboratory tests are valuable and compensation may be justified. The worker very properly should be given the benefit of what slight doubt exists.

For several years the New York State Division of Industrial Hygiene has offered to make the necessary tests for physicians at cost, but for some reason physicians have not availed themselves of this offer. About two-thirds of the troublesome cases could probably be disposed of, from a compensation point of view, if the physicians would prepare their cases fully, including the necessary laboratory tests of blood and urine.—May R. Mayers, *Indust. Bull.*, New York Dept. of Labor, 12, 2:33-34 (Feb.), 1933.

E. R. H.



## FOOD AND NUTRITION

Microbiology of Frozen Foods.  
VI. The Survival of Pathogenic Microorganisms in Ice Cream—Numerous studies have been made on the longevity of pathogenic microorganisms in dairy products with the exception of ice cream. This product has no doubt been neglected because freezing was thought to be destructive to microorganisms. However, numerous epidemics of disease have been traced to ice cream. Since tuberculosis is the most important disease transmitted by dairy products the longevity of these organisms in ice cream was studied. Two members of the salmonella group were also studied. The following organisms were used: *S. aertrycke*, *S. enteritidis*, *Br. abortus* Bang, *Br. abortus* porcine, *Br. melitensis*, *Mycobacterium tuberculosis* hominis (Strains A, I and S), *Mycobacterium tuberculosis* bovis and *Mycobacterium tuberculosis* avium.

Guinea pigs were injected with 1 c.c. amounts of the ice cream samples containing the Brucella and tubercle organisms. All animals remaining alive after 2 months were necropsied. The animals inoculated with the ice cream tubercle bacilli were examined, at the time of death, for characteristic lesions of the spleen and liver and at the point of injection. The paratyphoid and undulant fever organisms were frozen in the ice cream for a period of 36 months and in all cases the organisms were still viable and present in sufficient numbers to be rather easily detected. The different strains of the tubercle bacilli were still viable and potent after 30 months. All produced characteristic lesions in guinea pigs in a comparatively short time.

While the artificially inoculated ice cream contained more organisms than would be encountered in ice cream made from naturally infected raw milk, such data suggest that ice cream should not be considered as a safe food just because it is frozen.—G. I. Wallace and Rhoda Crouch, *J. Dairy Sci.* 16:315 (July), 1933.

The Vitamin B and G Content of Wheat Germ, Rice Polishings, Cottonseed Flour and the Residue from Fermented Rye Flour—Rats, 28 to 29 days old, were used as experimental animals. In testing for vitamin B, a basal diet of purified casein, Osborne and Mendel salt mixture, starch, butterfat, cod liver oil and yeast was fed. In testing for vitamin G, a basal diet of purified casein, Osborne and Mendel salt mixture, butterfat, cod liver oil and the extract from 90 gm. of white corn plus cornstarch to make 100 per cent was fed.

In both cases, at the end of the 2-week depletion period the material to be tested was fed. At the end of the 8-week test period, the rats were killed and autopsied.

The samples of wheat germ, cottonseed flour, and rice polishings were found to be excellent sources of vitamin B. All three substances contained approximately one-half as much of the anti-neuritic factor as did a composite sample of dried yeast. As a source of vitamin G they differed widely. Wheat germ was found to be the richest of the three substances, containing about one-sixth as much vitamin G as did the yeast. Cottonseed flour was found to have about one-tenth as much of this vitamin as yeast, while rice polishings

had only about one-twentieth. Whole wheat (soft winter) was found to be a relatively poor source of both vitamins B and G. The flour made from the residue from fermented rye grain contained a very small but appreciable amount of vitamin B.—Hazel E. Munsell and Grace M. Devaney, *Cereal Chemistry*, 10:287 (July), 1933.

**Vitamin C Content of Baldwin Apples and Apple Products**—Since Nelson and Mottern in 1932 (*A.J.P.H.* 22, 6:587–600, June, 1932), reported that lead arsenate sprays applied to orange trees considerably reduced the vitamin C content of the fruit, and since apples are almost universally sprayed with arsenic compounds and other toxic substances, the present investigations were undertaken to compare sprayed and unsprayed Baldwin apples grown in Massachusetts. Lime-sulphur and lead arsenate were used and the usual spray schedule was followed.

Guinea pigs were fed, in proportion to their weight, a basal ration of rolled oats and wheat bran, vitamin C-free baked milk powder, butterfat, cod liver oil, and salt. All vitamin C was derived from the apples. The sprayed apples were found to be fully as rich in vitamin C as the unsprayed apples. Four gm. daily of either sprayed or unsprayed Baldwin apples per 300-gm. guinea pig, gave excellent weight gains and full protection from scurvy. In 2 of 3 tests the sprayed fruit appeared to contain slightly more vitamin C than the unsprayed.

Tests were also made to determine the effect of storage on vitamin C. In 4 to 6 months of storage, at 36° F., Baldwin apples lost about 20 per cent of their vitamin C content; in 8 to 10 months the loss was nearly 40 per cent.

Freshly expressed Baldwin apple juice was found to be nearly as rich in vitamin C as the fresh apples. Little

loss occurred during the first 24 hours after extraction. However, benzoated or pasteurized ciders, over 48 hours old, failed to retain an appreciable quantity of vitamin C.

Canned Baldwin apple sauce, either strained or unstrained, proved to be a poor source of vitamin C, the unstrained being somewhat superior to the strained.—C. R. Fellers, M. M. Cleveland, and J. A. Clague, *J. Agri. Res.* 46:1039 (June 1), 1933.

**The Iodine Content of Hens' Eggs as Affected by the Ration**—The common use of eggs in the human dietary, especially for infants and invalids, and the rather extensive use of iodine in the treatment of endemic goiter, make it desirable to have further information on the extent to which the iodine content of eggs is affected by the iodine intake of the bird.

Eighteen White Leghorn pullets were divided into 3 lots of 6 birds each. In addition to the basal ration, lot 1 received dried kelp, lot 2 iodized linseed meal, and lot 3 potassium iodide evaporated on dextrin. These products were fed in gelatin capsules in such amounts that each bird received 2 mg. of iodine daily.

After 4 weeks, the kelp feeding in lot 1 was discontinued, and the amount of iodine in the form of iodized linseed meal and potassium iodide was increased to 5 mg. daily, in the case of lots 2 and 3. The feeding of 2 mg. of iodine daily, either as kelp, iodized linseed meal, or potassium iodide, increased the iodine content of the egg approximately 75 times. When the level of iodized linseed meal and potassium iodide was increased to 5 mg. of iodine daily, the iodine percentage of the egg was increased about 150 times.

The amount of iodine in eggs is independent of the form in which it is fed to the bird, and the percentage of iodine

in eggs immediately decreases upon the discontinuance of iodine feeding.

The authors express the opinion that whether eggs of a known iodine content have a particular place in human nutrition depends upon whether the iodine requirements of the people of a given locality are provided from other sources. It is common knowledge that the natural foods and drinking water of certain sections are deficient in iodine, and that some form of medication must be resorted to in order to prevent and control endemic goiter, but how this can be best accomplished is an open question.—O. H. M. Wilder, R. M. Bethke, and R. P. Record, *J. Nutrition* 6:407 (July), 1933.

**Specificity of Hexuronic (Ascorbic) Acid as Antiscorbutic Factor**—After presenting a review of the literature both favoring and opposing the thesis that hexuronic (ascorbic) acid is itself vitamin C the authors describe certain experiments to ascertain whether antiscorbutic activity is an inherent property of hexuronic acid itself or due to some associated impurity. It was shown that the antiscorbutic activities of several natural sources of hexuronic acid, as, for example, ox suprarenal gland, were approximately proportional to the amounts of hexuronic acid recoverable from them. By biological assay specimens of hexuronic acid from different sources, such as suprarenal gland and paprika, were found to have identical antiscorbutic activity.

Tests of specimens of hexuronic acid of varying degrees of purity demonstrated that a given amount of hexuronic acid always had the same activity irrespective of the presence of impurities. Hexuronic acid after purification and recrystallization always maintained its original activity.

A large variety of foodstuffs covering

the widest possible range of biological activities were tested chemically for their hexuronic acid content. By experiment it was then found that the vitamin C value calculated from the known hexuronic acid content in all cases agreed with the value as determined biologically. The hexuronic acid content of lemon juice, orange juice and grapefruit juice was estimated by the intensity of ultra-violet absorption and the values obtained were in good accord with titration results and biological determinations.

With the knowledge that the suprarenals of normal guinea pigs had intense antiscorbutic activity and that this activity disappeared with the development of scurvy, experiments were conducted to demonstrate that the loss of antiscorbutic activity in the suprarenals ran parallel with the disappearance of hexuronic acid. A similar phenomenon occurred in the liver of the guinea pig.

Chemical tests on the suprarenals and livers of rats and dogs which are able to synthesize their own vitamin C when none is provided in the diet showed that the maintenance of vitamin C activity was associated with the presence of hexuronic acid. The authors further report that the conditions of aeration, heat and alkali which favor the destruction of hexuronic acid are the same as those which are known to determine the destruction of vitamin C activity.

Experiments with germinating seeds showed that hexuronic acid is synthesized concurrently with vitamin C activity by the plant on germination.

The authors conclude that hexuronic acid is itself vitamin C and they recommend the adoption of a specimen of hexuronic acid as an international standard of vitamin C activity.—Leslie Julius Harris and Surendra Nath Ray, *Biochem. J.* 27:580, 1933.

## CHILD HYGIENE

Effects of Unemployment on Children and Young People in Belgium—*Report based upon findings of the Oeuvre Nationale de l'Enfance, Brussels. Richard A. Bolt, M.D., Dr.P.H., Oberlaender Award, Berlin, Germany.*

THIS report gives a very good idea of the number of young persons unemployed in Belgium, the effects of such unemployment, and the measures which have thus far been taken to prevent serious breakdown among the child population. In addition to the public health and social measures already applied, two new organizations were created to assist the unemployed. They were the General Relief Committee for Brussels and environs and the Central Assistance and Loan Committee for out-of-work employees.

Unemployment in Belgium is of too recent date, it seems to us, to allow of a serious study being made of its effects on children. On the other hand, the organizations created or subsidized by the Oeuvre Nationale de l'Enfance, the local or regional institutions and the private organizations are so numerous, and their work is so systematically planned, that one may hope to be able to prevent, or to palliate the effects that the unemployment of the parents may have on the physical and mental development and the moral and social attitude of the children.

*Infants*—From inquiries made among child welfare organizations, and from answers given by doctors and nurses, it would appear that, on the whole, the baby lacks for nothing—the baby is well cared for, because the parents are intelligent enough to make sacrifices for it. Child welfare propaganda has taught the parents how to keep their little ones in good health and to give them what they need, even at the price of personal discomfort.

This must not lead us to conclude that in Belgium no infant suffers through the weakness of the nursing mother or through the impossibility of giving it a prescribed diet.

This is often the case, particularly among families already in straitened circumstances before the economic crisis and that the crisis has reduced to dire poverty.

The Oeuvre Nationale de l'Enfance notes a steady increase in the number of children cared for by its Child Welfare Centers and its Home Visiting Service. The figures have increased from 61,441 in 1929 to 78,064 in 1931. It would be a serious mistake, however, to attribute this rise to parental unemployment—at least, up to the present time; it is the result rather of child welfare propaganda. Indeed, it is legitimate to hope that the extension taken by child welfare work will permit of forestalling the effects of unemployment on the child.

*Children of Preschool Age*—These children, from 2 to 5 years old, include two categories: those who attend nursery schools, and those who do not. The latter, even in normal times, are not touched by the organizations; they are the "little unknown," who are no longer babies because "they eat everything," who have to be pleased with what is given them, and who have no means of voicing their troubles. The following observation, made in one of our big provincial institutions, throws light on the situation on these "in-betweens":

"They are brought to us in the belief that they are ill; they are only badly fed. It is sad to hear them crying, because, after all, we must let them go back to their families. And the parents again give them the same food as the older children, which is not suited to them at all. There is no compensation in the sacrifice of the parents, who give them a copper or two to buy sweets to make up for an unsuitable meal."

*Children of School Age*—Among older children the situation is less serious. There are, of course, many who lack supplementary food (weakly children) or the substantial nourishment (children of a large family) they are in need of, but such cases are known and supervised. They are given meals by the school organizations, who are doing really excellent work. School kitchens function in most important centers, but it is none the less true that the weakly and the undernourished must be sought out. Such children exist, not only as in the past among the population customarily dealt with by the Oeuvre Nationale de l'Enfance, but also among

families that never thought they would one day be forced to appeal to a charitable organization and that only resign themselves to do so when they are at the last gasp.

The children of school age benefit by school holiday camps, both at the seaside and in the country. In 1931 the Oeuvre Nationale de l'Enfance received into such institutions 6,592 children, totalling 514,476 days' maintenance. In 1932 the Oeuvre Nationale de l'Enfance paid particular attention to applications made by out-of-work families. Out of a total of 9,884 children admitted into its various institutions (up to October 1), 1,057 were children of the unemployed, chiefly from Brussels and the provinces of Hainaut and Liege.

Special measures against unemployment have been suggested and some of them have been put into operation. The following are the most important:

The Socialist Workers' Central Council has suggested the opening in every library of a special reading-room, the arrangement of debates, study groups, courses of lectures, walking or cycling tours, visits to industrial, social and educational institutions, as well as local study weeks or fortnights. The Trade Union Federation of Charleroi has established additional training classes.

M. Renard, Permanent Deputy of Brabant, suggested an extension of the school age or, at least, attendance at regular technical courses for pupils about to leave school. For apprentices proper, who are already on the dole, attendance would be compulsory and a return for cash received.

M. E. Veuchet, Inspector General of Technical Education, Province of Hainaut, proposed that the worker should be taught trades similar to his own, especially the small jobs of everyday life, the original trade remaining of course the main subject. The unemployed of overcrowded branches could be taught trades which are less popular.

M. Damoiseaux, Governor of Hainaut, and M. Pasteur proposed in addition to a policy of public works absorbing large numbers of unemployed, the extension of the school age to 16 for both boys and girls attending elementary, technical and domestic schools; and for young persons between 16 and 19, attendance at special technical courses.

In 1930, Mme. Plasky, Principal Inspector, Ministry of Justice, Labor and Social Welfare, suggested forbidding factory work for girls between 14 and 16, and introducing compulsory apprenticeship in sewing, dress-making or housekeeping.

These suggestions led to the drafting of two bills laid before Parliament by M. Masson in 1931. The first proposed that girls of 14 years should have 2 additional years of domestic economy; the second provided penalties for infractions of the law (to be voted) forbidding the employment of women and children, and also of their period of domestic training. Serious opposition, however, was raised on account of the alleged need for female labor in certain of the industries.

Unemployment seems to be more serious for the young men than for the young girls; for wherever the kind of work permits, the young girl is preferred, since she accepts a lower salary, does equally good work and is often quicker and more accurate than the young man.—

*Children, Young People and Unemployment.* Part I, Belgium, pp. 93-106. Published by The Save The Children International Union, 1933. 15 Rue Levrier, Geneva, Switzerland.

## PUBLIC HEALTH NURSING\*

Echoes from the I. C. N.—American nurses are still wending their way homeward from the International Congress of Nurses which began in Paris, July 7 and ended in Brussels, July 15.

Over 2,000 nurses from 42 countries registered at the Congress.

The seven new countries admitted to membership before an enthusiastic audience in the great Trocadero in Paris were: Austria, Czechoslovakia, Estonia, Iceland, Japan (including Korea), and Hungary.

Some special topics of discussion were:

*Mental Hygiene*—Experience in psychiatry and mental hygiene was recommended as part of the basic training of every nurse. Miss Taylor of Yale University advised that schools of nursing be discontinued in mental hospitals because most of the care required is of custodial nature. Training in general hospitals which have the stress of mental factors emphasized directs the attention of the nurse to the whole human being.

A delegate from Finland said that her country had improved the mental hygiene teaching of its nurses by insisting that the supervisors and superintendents in mental hospitals be properly prepared for their work by post-graduate courses.

The recommendation was made that the mental hygiene committee of the I. C. N. consider further the development of under- and post-graduate courses in mental hospitals and the development of post-graduate courses for teachers of mental hygiene.

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

*Supply and Demand*—It was brought out by an American nurse that satisfactory maintenance of community health would entail the employment of 53,000 public health nurses in the United States, when actually there are about 16,000 employed.

If student nurses in hospitals were replaced by graduate nurses, 70,000 of the latter would be needed to maintain good nursing service in these institutions.

Bulgaria and India reported a shortage of trained nurses.

*Nurse Journalists*—The Editor of the *British Journal of Nursing* reported a dearth of suitable women for posts open in journalism. It was brought out that the first requisite for journalism is "the ability to write clearly of things felt, heard, and imagined."

*State Supervision of Nursing*—The Grand Council recommended that state registration of nurses be instituted in all countries, that registration be made compulsory, and that nursing schools be adequately inspected. It was suggested also that good standards of nursing could not be upheld without the support of the medical profession.

*Public Health Nursing* (Emphasized at the Brussels Meetings)—A Canadian delegate urged that nursing education be interpreted in terms of *end results*. "Exact hours of theoretical instruction and exact hours of ward practice are not measures of education. Judgment must be based rather on qualitative results. Was the theory well integrated with practice to give the ideas color and meaning?"

A delegate from Brazil thought that all public health nursing should be administered through government bureaus,

as is done in her country, where it is acknowledged that public health nursing "should be an official service, like the public schools."

Miss Goff, the nurse representative on the Health Section of the League of Nations, speaking for Mary E. Gardner, read the following recommendations on public health: "(1) That an international clearing house be established at the I. C. N. headquarters; (2) that preparation for public health nursing be worked into the basic course; (3) that refresher courses be arranged for all public health nurses; (4) that nursing texts be revised to include preventive and social aspects."

New Officers: *President*, Miss Lloyd Still, Matron and Superintendent of Nurses at St. Thomas' Hospital, London (Great Britain); *First Vice-President*, Miss Clara D. Noyes (United States); *Second Vice-President*, Miss Bella Alexander (South Africa); *Treasurer*, Miss Ellen M. Musson (Great Britain); and *Secretary*, Miss Christiane Reimann (Denmark).

The next Congress will be held in London in 1937.—Paris—Brussels in Retrospect—*Trained Nurse & Hosp. Rev.* LXLI, 2:114, 117, 123, 125, 133, 134, 135, 139 (Aug.), 1933.

The Public Health Nurse and the Federal Government—Federal recognition of the need for standards in public health nursing is seen in an editorial preface to a reprint just issued by the Public Health Service of the United States Treasury Department.

The reprint is of "The Objectives in Public Health Nursing" and "Minimum Qualifications for Those Appointed to Positions in Public Health Nursing." The "objectives" and "minimum qualifications" were printed first in *Public Health Nursing* after their determination by committees of the National Organization for Public Health Nursing working in connection

with committees of the American Public Health Association. The editorial note follows:

Since public health nursing has assumed a definite and important place in modern public health programs, it would seem desirable that the objectives of public health nursing be outlined and the qualifications of the public health nurse be tentatively set as an approach to standardization. As of especial interest, therefore, to public health administrators and to those desiring to enlist their services in this specialized field of nursing, there are presented here two articles dealing with objectives and qualifications. These articles are published not with the suggestion of finality but rather as points of departure for future development based on experience and attainable ideals in the important field of public health work.—

N.O.P.H.N. News Release, Aug., 1933.

Two of Our Nursing Leaders Are Doing Their Bit—Sophie C. Nelson, President of the National Organization for Public Health Nursing, and Lillian D. Wald, President of the Henry Street Visiting Nurse Association and Honorary N.O.P.H.N. President, have just accepted appointments to serve with Mrs. Franklin D. Roosevelt and some fifty other leaders on the National Women's Committee for the 1933 Mobilization for Human Needs, the nation-wide welfare appeal. Miss Nelson is the only member of the Committee from Massachusetts.—N.O.P.H.N. News Release, Aug., 1933.

### Good for New Mexico!

Budget hearings this year have been enlightening and a pleasure to attend. At a time when the common cry has been lower taxation—when worried county commissioners, school board members and city councilmen have faced the problem of balancing their county's or city's budget, the pioneer spirit of individual service and sacrifice for the common good, has prevailed.

In Otero county a rising vote of men and women, all of them taxpayers, who were attending the preliminary budget hearing, indicated that they preferred a full term of school and the services of a public health nurse to lower taxation by disproportionate

reduction in the program for the education and welfare of their children.

In one county the commissioners after reducing every item in the budget, reduced their own salaries 20 per cent—But—there was no thought of discontinuing the nursing service.

In another county, no appropriation was made for the nursing service when the preliminary budget was prepared. When the final hearing was held, advisory nursing committee members and other interested lay people, all of them taxpayers, demanded that an appropriation be made for the nursing service.

In still another county which does not support a nursing service, the city attorney, representing the county seat, offered \$400, office space, water and light, if a nursing service could be secured for that county.

At another hearing four superintendents of schools attended the health budget hearing and pledged their financial support to the service that they considered essential to the promotion of health and sanitation in their schools.

What is happening in New Mexico? Just

this—through the health education programs of the public health nurses our people are becoming public health minded. Health education in the schools, home visits, classes in home hygiene and care of the sick, and other phases of the excellent public health nursing programs being carried by the New Mexico nurses have brought the work of the nurses before the people. Advisory nursing committees deserve much credit. The members have attended meetings, advised and assisted the nurses, and last, but most important, they have interpreted the work to their neighbors. Publicity given to an adequately rendered public service will eventually cause a demand for more of this service. Here's to New Mexico's Public Health Nurses! To them go the credit and the glory for the demand for the nursing services at a time when they are most needed, when lack of funds causes county commissioners and taxpayers many a sleepless night.—

Elenor L. Kennedy—The Nurses Page—*New Mexico Health Officer* III, 3:7 (Aug.), 1933.

## EDUCATION AND PUBLICITY\*

**Education and Publicity Headquarters**—When you wish to find someone to talk to about health education and publicity at Indianapolis drop in at our Headquarters. We will be better situated than at Washington.

Hundreds of questions can be answered by the classified portfolios on display. There will always be fellow workers present ready to exchange ideas and experiences.

**Surely People Are Making Wills**—And bequests are being planned whatever may be the general economic situation. *Will your agency be among the elect?*

A good job of bequest seeking calls

for much careful preparation. As a first step could a board member or other volunteer, with or without the collaboration of a staff member, look into the matter and make recommendations as to the next steps?

A detailed outline of methods, with sources of information, is a 7-page memorandum, "Bequests and Trusts," issued by Social Work Publicity Council, 130 East 22d St., New York, N. Y. 6 cents; 2 or more copies, 5 cents each.

**Have You a List for Indianapolis?**—Expense accounts are likely to justify most for those who list in advance some questions to be answered, and some problems to be discussed. At least one question to be asked, one problem to be talked over, one idea to be passed on, will give point and purpose to one's

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Routzahn, 130 East 22d St., New York, N. Y.



attendance at the A.P.H.A. October meeting in Indianapolis.

**The Psychology of Health Education**—This is the theme for the Health Education Institute, Indianapolis, Oct. 7-9, 1933:

Its application to mass education and its utilization in the written and spoken word and to the graphic media.

The faculty: Dr. Iago Galdston, Dr. H. E. Kleinschmidt, Bertrand Brown.

The outline:

- a. Why the psychology of health education?
- b. The psychologic nature of the recipient of health education.
- c. Fundamental principles relative to:
  1. Arresting attention
  2. Enlisting sympathy
  3. Imparting information
- d. Meaning and mechanism of motivation.
- e. Practical demonstrations; the application of the outline of psychologic principles to health education instruments; the spoken text, the printed text and graphic material.

Applications: to American Public Health Association, 450 7th Ave., New York, N. Y.

**Too Many Ideas on the Air?**—The pleader for public health is tempted to cover too much ground, to try to tell too many things, without telling enough on each point to make it clear to the diverse audiences reached by radio. Examples and other illustrations and comparisons will add interest as well as understanding. To state a situation as it will be met by a health department will mean more to the listener than the assertion that the health department will surely handle such a situation.

One idea, one argument, one illustration, any one point lodged in the minds of radio listeners means more for the local health department than any well rounded review of all that the department does and all the reasons for its maintenance.

Let's concentrate and clarify *and* convince.

**Are Radio Talks Too Casually Presented?**—The summer's output of broadcast appeals for maintenance of health department work show that we can get time on the air. The broadcasts do not show that we are willing to pay the price for holding the audience.

The subject, the sponsorship, the well known participants, each draw their share of audience. But it is up to the participants to hold and to convince that audience. Even a newspaper reader is probably less fickle than the radio listener.

Most of all do we need a bit of showmanship in our broadcasts. Whatever we say will interest and convince if well presented. Rehearsals before unafraid critics are almost essential to success. The individual broadcaster should become familiar with the *sound* of every word of his manuscript. Emphasis and tone of voice should be studied and marked on the manuscript.

Where two or more participate in a discussion, individual familiarity with the *sound* of the words should be followed by joint rehearsal. Here a good director of amateur theatricals could be brought in to advantage. He should be expected to be as hard-boiled as when holding a play rehearsal. He should be expected to see that our health talkers get their lines over to an invisible, but very real and very human audience.

Big names, prominent sponsorship, and importance of the topic will not put put over an unprepared presentation.

**Is "Per Capita" Convincing?**—A few weeks ago "50 cents per capita" was emphasized in a radio talk. Not long ago national "per capita" costs of some \$4 or \$5 each for fire and police protection were compared with the much smaller national "per capita" cost of public health services. Who is "per

capita"? What are counted? What is the relation of "per capita" to the individual tax-payer? *Are we clear? Are we convincing?*

Comparing national "per capita" costs for public services has little meaning, and less force in relation to costs in "our town."

And how can the small town listener keep his attention on the argument for public health services when we bring in comparisons with expensive "per capitas" for fire and police protection of which he has so little.

May those who write and those who speak give earnest attention to how to make "per capita" significant and convincing.

**Health Education**—The following are listed in *Library Index*, 450-7th Ave., New York:

Allen, E. H., M.D. Promoting health consciousness through visual education. School physicians' bulletin (Albany), 3:9-11, June, 1933.

Barber, S. R. Quelling the quacks. Part IV. *Hygeia* (Chicago), 11:407-10, May, 1933.

Common sense in health propaganda. *American Journal of Public Health* (New York), 23:478-79, May, 1933.

Goldstone, Rose. Our kindergarten health project. *American Childhood* (New York), 18:11-12, 44-45, May, 1933.

Lane, P. W. Today's program in health education—and tomorrow's. *Nation's Schools* (Chicago), 12:13-18, July, 1933.

Mackintosh, J. Health exhibitions. *Mother and Child* (London), 4:124-28, July, 1933.

Normington, Flavilla. The school lunchroom—an important cog in the teaching machine. *Nation's Schools* (Chicago), 11:45-48, April, 1933.

Streit, W. K. Interpreting the health and physical education program to the public. *Journal of Health and Physi-*

*cal Education* (Ann Arbor), 4:36, 62, May, 1933.

Teaching health. *Hygeia* (Chicago), 11:457-60, May, 1933. A health day program in a one-teacher school, by Mary Westcott.—Health for a nickel, by J. P. Godfrey.—Correcting remediable physical defects in junior high school, by S. P. Prenn.

Teaching health. *Hygeia* (Chicago), 11:742-45, August, 1933. The senior high school teacher observes her pupils, by R. E. Shuchowsky.—A clean-up project in a rural school, by Jewel Nolen.—The health house helps to build health habits, by Eva Nelson.

Whitney, Anne. Health education—whither bound? *Journal of Health and Physical Education* (Ann Arbor), 4:3-5, 39, May, 1933.

**We Should Know Them**—Two new committees of the National Conference of Tuberculosis Secretaries are of interest to this department:

*Child Health Education*: Edna Bond, Newark, N. J., chairman; Jean Latimer, Boston, Mass., Mrs. Blanche de Koning, Grand Rapids.

*Health Education*: Robert W. Osborn, Buffalo, chairman; William F. Higby, San Francisco; Rowan Whealdon, Newark, N. J., secretary; Dr. Henry D. Chadwick, Detroit, medical consultant; Dr. Iago Galdston, New York, staff adviser.

**A Use for Your Photographs**—They may not be "cure" pictures but they may illustrate a situation or an idea suitable for *Journal of the Outdoor Life*, 450 7th Ave., New York, N. Y.

The *Journal of the Outdoor Life* pays a slight honorarium for any photographs suitable for publication submitted by its readers. They are judged (1) according to their subject matter, namely, human interest scenes dealing with some phase of cure-chasing, whether at home or in a sanatorium, and (2) for their technical excellence and reproducing qualities. Please secure written permission from anyone whose picture you are submitting and tell us where it was taken.

By the way if you have not seen the new *Journal of the Outdoor Life*, you will wish to ask for a sample copy to see the transformation due to careful planning of paper, typography and pictures.

The "Women's Crusade" for Human Needs—A nation-wide educational movement being organized to supplement the fall and winter community chest fund raising campaigns, as well as to supplement all legitimate efforts for the maintenance of essential health and other welfare services, public as well as private, will affect health work.

This is the Women's Crusade, the National Women's Committee of the 1933 Mobilization for Human Needs. Newton D. Baker is chairman of the National Citizens' Committee, and Mrs. Franklin D. Roosevelt, chairman of the National Women's Committee, with headquarters in Room 1815, Graybar Building, New York, N. Y.

Inspiration for the plans offered to local committees comes from the Women's Crusade which so notably supported the April, 1933, campaign of the Cincinnati Community Chest.

The purpose of the Women's Crusade is educational, not financial. It seeks to interest more women in the welfare work of their communities; to help women understand its problems and aims, especially as these have been affected by recent changes; and to guide women in stimulating public opinion toward a generous meeting of human needs through their local fund-raising agencies.

These aims are to be accomplished through informal discussion, public speaking, answers to criticism, distribution of literature, and other measures as agreed upon with the local community chest or other welfare campaign, of which the Women's Crusade should be a closely linked part.

The immediate purpose is to provide an educational background for local community efforts to raise funds for the agencies not supported by taxes. Inci-

dental to this purpose it will be necessary in many communities to interpret the needs, resources, and relationships of the public agencies. And it may be expected that later the same local Crusade groups, with their understanding of community problems, and their fine enthusiasm for service will be available as the public services face critical situations.

Local health workers may well get in touch with the local Crusade groups as they are organized. If organization is delayed write to the National Women's Crusade Committee stating the situation and suggesting capable women for local leadership. A copy of the Crusade handbook will be sent upon request to the National Women's Committee without charge to the local leader. Price to others, 10 cents; special price for quantities.

Eight of the cooperating national organizations are concerned with public health.

Why Not?—This from *Public Health Nursing*, New York (Sept., 1933):

In examining school children why send a note home to the parents only when there are defects? Why not also when the child is in good condition? This has been tried in several places with excellent psychological effect on the parents. For example—"John was examined by the school physician today and was found to be in excellent physical condition. You are to be congratulated on the good care you are giving him and trust you will continue it." Can't you see the parent swelling with pride at this; and also the envious glances of neighboring parents whose children had some defects, and the subsequent scrambling on their part to get the defects corrected as soon as possible?

This is one of the many valuable points brought out in the Health Education Conference held in Ann Arbor, Michigan, in June, under the auspices of the American Child Health Association.

Health Advice in Newspapers—The "Annual Directory of Features"

(*Editor and Publisher*, New York. Aug. 26, 1933. 10 cents) lists the following:

"Health," Dr. Morris Fishbein; "Health," Dr. Copeland; "Health Column," Dr. W. A. Evans; "Health Column," Dr. Logan Clendening; "Health Column," Dr. Iago Galdston; "Health and Beauty," Dr. Sophia Brunson; "Health, Heart and Home Page," unsigned; "Here's to Your Health," Dr. Frank McCoy; "How I Keep Fit," Celebrities; "How's Your Health," Dr. Iago Galdston; "How to Reduce Without Dieting," Lilyan Malmstead; "Secrets of Health and Success," Dr. Louis E. Bisch; "That Body of Yours," Dr. James W. Barton; "Your Child's Health," Dr. Michael Shuman; "Your Eyes, Ears, Nose and Throat," Dr. H. Hoare; "Your Good Health," Dr. Claud North Chrisman; "Your Health," Dr. Royal S. Copeland; "Your Weight and Your Height," Dr. James W. Barton.

In addition, classified under "Food" are the following and others:

"Eat and Grow Thin Diet," Dorothy MacLennan; "Food and Health," Dr. Shirley Wynne; "Mrs. Babe Ruth's Diet"; "Pure Food Articles," Dr. Royal S. Copeland; "Thirty-Day Diet."

The lists are given here to show the extent and the sources of the material sold to daily newspapers in the United States and Canada. The contributions classify as good, not so good, indifferent, and bad.

In *Hygeia* for September, 1933—are the following—and other articles:

"Football Injuries"; "Colleges and Health"; "Are They Ready for School?" "Removing Rural School Handicaps to Mental Accomplishments"; "The Mother and the School"; "Sex Education": Part III; "What Your Child Eats at Noon"; "Can School Days Be Safe Days?" "Training for Athletics and Health"; "Progress in Preventive Medicine"; "School and Health" (including "Projects in Teaching Health Originated by Southern Illinois Normal University"); "Let Us Go to the Foot Carnival"; "Building a Health Village"; "Let History Live!" "Pigs Help to Teach Hygiene"; "Combining Music With Health"; and "New Health Books and Teachers' Materials."

#### EDUCATIONAL MATERIAL

"What Builds Babies? The Mother's Diet in the Pregnant and Nursing Periods." Children's Bureau, Washington, D. C. 7 page folder. Revised edition. Single copies *free*.

"Mother's Milk — Summer Complaint," reprinted from *Hygeia*, June, 1923 and June, 1933. American Medical Assn., 535 N. Dearborn St., Chicago. 32 pages. 15 cents; quantity rates. Popular and practical; several attractive illustrations.

"Appendicitis." John Hancock Mutual Life Insurance Co., Boston. 5 small pages. *Free*. Explains and emphasizes the following:

In the presence of abdominal pain, give nothing by mouth. Never give laxatives. Apply an ice pack. Call your family physician. Abdominal pain which persists over a period of 6 hours is usually serious.

"Milk for the Family." *Farmer's Bulletin* 1705. 30 pages. Supt. of Documents, Washington, D. C. 5 cents. Probably *free* from Dept. of Agriculture, Washington, D. C. Supersedes "Milk and Its Uses in the Home." Values of, choosing, home care of milk, etc.

"Children's Bureau and Other Publications Relating to Children." Supt. of Documents, Washington, D. C. 15 pages. *Free*. Classified list of U. S. Government publications.

"Salt for Oral Health," by H. T. MacDonald. *Health*, Canadian Social Hygiene Council, 105 Bond St., Toronto, Ont., June, 1933. 15 cents. "Ordinary table salt seems to fulfil the requirements of a good dentifrice. Here is the story of why this is true."

Have you passed on to local outdoor recreation leaders the article on "Loss of Actinic Sunshine as a Health Problem of Cities," by Dr. F. O. Tonney (in August, 1933, *Journal*)? Of course, marking the second suggestion on page 780. An editorial writer on one of your local newspapers might welcome an

opportunity to discuss material in that article.

*Nutrition Notes*, issued September to June, is a little publication of great value to those who desire "brief mention of newer findings in the field of nutrition, with suggestions for feeding families at low cost." 50 cents a year; 8 cents a copy. Nutrition Bureau, A.I.C.P., 105 East 22d St., New York, N. Y.

We have been favored with a set of post cards on the prevention of accidents, issued by Instituto de Reeducación Profesional, Madrid, Spain. The illustrations show that many accidents in Spain as well as in the United States result from carelessness as well as the lack of safety devices.

Single copies only to health workers outside the state will be supplied by Massachusetts Dept. of Public Health, Boston:

"Why Be Vaccinated?" 4 pages, with several striking diagrams.

"Food for the Teens," 8 pages. What foods are sources of this and that; 3-page table of the form in which specified foods may be eaten and their values; table of calories; etc.

"Caring for Teeth" and "Eating for Teeth." 2 pages.

"The Permanent Teeth." 2 pages; 2 diagrams.

"How to Judge Nutrition of Children." 1 page. "The well nourished child shows . . ."

"The Control and Prevention of Rabies." 6 pages.

"Good Eating Habits." 4 pages. Habit training; how to make certain foods more acceptable.

"Recipes for Cracked Wheat." 1 page.

"Epidermophytosis (Athlete's Foot): Its Prevention and Treatment." 5 pages.

Metropolitan Life Insurance Co., New York, N. Y., and Ottawa, Ont., will supply the following:

"The Custodian and the School Child." 16 pages. The janitor as a health worker.

"Tonsils and Adenoids. Is Your Child Handicapped?" 4 pages. Delightful child face on the cover.

"Your Little Child Goes to School. A Message to Fathers." 8 small pages. At last "father" is getting his share.

"The Safe Walker's Memo Book." 16 pages, partly blank. Red and black diagrams on walking in city and country. "When the pages have been filled, the local representative of the Metropolitan Life Insurance Company will be glad to furnish a new booklet."

"The Real Driver's Log Book." 18 small pages. Pages for recording your trip; text and illustrations on "The Art of Driving."

"Check Your Car for Safety and Performance." 22 small pages. Blank forms for records; text and series of questions as to safety precautions for car owner.

"Protection of Workers Exposed to Chromium and Its Compounds." 15 pages.

"Organizing for a Traffic Survey." 24 pages.

"Studying the Movement of Vehicles." 24 pages.

"Finishing the Job in Diphtheria Prevention," by Donald B. Armstrong. 6 page reprint. What more to do in New York—and elsewhere.

"The Tuberculosis Movement Today," by Donald B. Armstrong. 5 page reprint.

Again comes "Statistical Report of Infant Mortality for 1932 in 955 Cities of the United States," issued as usual by American Child Health Association, 450 7th Ave., New York, N. Y. 31 large pages. Single copies *free*. The interpretive comment adds much to its value for use in publicity.

"Reducing the Public Health Budget" was presented over an NBC-WJZ network on Sept. 5. George F. Canfield, Dr. Matthias Nicoll, Jr., and Dr. Kendall Emerson were the participants. Copies of the discussion for 15 cents from National Municipal League, 309 East 34th St., New York, N. Y.

Readers of this department who serve on the firing line in the actual production of copy will find serviceable background material in every issue of the *Journal*. Not to be overlooked is "A Selected Public Health Bibliography With Annotations," edited by Dr. Raymond S. Patterson.

"Services the Health Bureau Renders to the Public and Physicians" is a three-page tabulation classified under 20 headings. Quite a worth while idea for, say, once a year in the house organ of the public or private agency. *Bulletin*, Health Bureau, Rochester, N. J. July, 1933.

"Syphilis" was the subject of a broadcast over WFEA, Manchester, N. H., by Dr. H. W. N. Bennett, State Board of Health Clinic. Reproduced in *Health*, State Board of Health, Concord, N. H. July, 1933.

What is probably a fairly common phase of the rat problem is illustrated on the cover page of *Municipal Sanitation*, 24 W. 40th St., New York, N. Y. Aug., 1933. 25 cents. Photographs of similar dump piles could be used effectively in calling attention to such situations: "Water, food and shelter, and ideal layout for developing a plague of rats."

#### SCHOOLS AND CHILDREN

To those concerned with health teaching in the schools: re-read the first two paragraphs under "Health Education Conference at Ann Arbor," page 873, in the *Journal*, Aug., 1933.

The third issue of *Spyglass* was issued Sept. 15 by American Child Health Assn., 450 7th Ave., New York, N. Y. 75 cents for 4 issues.

"This periodical for children will help them bring into focus with their everyday living and health problems, important and useful information from a variety of sources.

The September issue contains timely material suitable for use in connection with the fall health activities in the schools. Illustrated.

Some of the school health articles in *Public Health Nursing*, 450 7th Ave., New York, N. Y. (Sept., 1933. 35 cents):

"A Health Program in a Private School"; "Evaluating the Home Visit"; "First Aid as It Affects Nurse or Teacher Load."

Significant features of the Seventh

Health Education Conference, at Ann Arbor last June, are brought out by Anne Whitney in *Child Health Bulletin*, American Child Health Assn., 450 7th Ave., New York, N. Y. Sept., 1933. The Conference "was unique in that it did not go on record as endorsing any formal resolutions or statements."

Two reasons for this might be suggested. First, the recent White House Conference on Child Health and Protection has crystallized for those working in health education a vast amount of material which offers a substantial body of standards and principles useful for many years to come. Second, the unpredictable elements in our present social and economic conditions have given workers a realization of a need for clear thinking and for flexibility in adaptation to changed conditions.

The same issue of *Child Health Bulletin* includes: "The Relation of Food to Health," by Mary Swartz Rose; "Coöperation in Health Work," by Kendall Emerson; "Health Education of Teachers: Some Trends in Their Preparation," by Ethel M. Mealey; "Evaluation of School Health Procedures," by George T. Palmer; "Child Health Literature," a bibliography of current material; "The Care of the Mother Before the Baby Comes—And Afterwards," references selected by Clara E. Hayes. The two sections, "For Parents" and "For Physicians and Nurses," are each divided under "Single Copies Free" and "Books and Pamphlets to Be Purchased Directly from Publishers or Local Booksellers." This last is a new and helpful addition to the details which characterize A.C.H.A. reference lists for making them easily usable.

This from the mast-head of *Safety Education*, 1 Park Ave., New York, N. Y., expresses the standard set up for safety work with children:

Life is made up of adventures; even crossing the street is an adventure! Some adventures are good and necessary. Others are

stupid and futile. Some bring the more abundant life. Others bring only waste of life and the material resources of life. . . . All adventures involve uncertainty and danger. A danger courageously met and intelligently controlled is part of the substance of a normal life. A danger carelessly met and ineffectively controlled results in defeat of purpose and even in tragedy. . . . This magazine is primarily for the use of schools in helping children choose their adventures wisely and in helping them carry these adventures through intelligently.

## PLAYS

"Chasing Germs." *Jamaica Public Health*, Kingston, Jamaica. Sept., 1933. Real folks; no fairies, no impersonation of germs!

"Three Pairs of Shoes," by Marion Holbrook. *Safety Education*, 1 Park Ave., New York, N. Y. Sept., 1933. 10 cents.

## MAGAZINE ARTICLES

"The Baffling Struggle Against Tuberculosis," by Dr. Kendall Emerson. *Literary Digest*, New York. Sept. 2, 1933. 10 cents.

"Beauty Without Bunk," by Dr. Ruth F. Wadsworth. *Collier's*. July 29, 1933. "Real beauty culture encourages Nature instead of attempting to improve it."

## YOU MAY BE INTERESTED

Those who are doing industrial health work will wish to get acquainted with *Industrial Medicine*, 844 Rush St., Chicago.

"In keeping with the spirit of the times this report was inexpensively prepared" in mimeographed form, says The Brooklyn Tuberculosis and Health Assn., 293 Schermerhorn St., Brooklyn,

N. Y. Pages are 5½ by 7½ inches. An effective page appeal for bequests—so frequently omitted. It is interesting to note that \$26,613 of the \$79,829 budget went for "Health Education and Promotion," the details of which are listed.

The September, 1933, convention of American Hospital Assn. included a "Round Table on Public Relations" with a "Report of Public Relations Committee," "Discussion of Proposed Program of Public Relations for Ensuing Year," "A Practical Basis for a Public Relations Program," "Presentation of Complete Public Relations Program," "Educating the Public Through Lantern Slides and Motion Pictures," with demonstrations. The "Round Table on Administrative Problems" included "How Can the Public Be Educated as to the Cost of Good Hospital Service?"

"Empire Health Week," announced for Oct. 1-7, 1933, established in England in 1912, has been observed in Jamaica since 1923. *Jamaica Public Health, Kingston*, says that

"Empire Health Week has been observed in Jamaica since 1923, and each year has shown an increase in the number of communities which have carried out programs of health education. And each year more and more people have during this week given consideration to questions of hygiene and sanitation at homes and schools. Doctors, preachers, teachers, lawyers, planters, officials and leading citizens have taken part and given talks on disease prevention. It is worthy of note that schools in every part of the Island have year after year prepared special programs, and in other ways taken an active part in carrying health teachings into the homes of each district. The topic of special study for Jamaica for the Health Week of 1933 will be Safe Water."

## BOOKS AND REPORTS

**Tuberculous Disease in Children: Its Pathology and Bacteriology—**  
*By John W. S. Blacklock. London: His Majesty's Stationery Office, 1932. 155 pp. Price, \$1.00.*

This highly interesting special report of the Medical Research Council by a student of the pathology of adult tuberculosis is an attempt to throw some light upon the paths of infection, their correlation with the type of tubercle bacillus, and the relative importance of air-borne and food-borne infections.

The author's material consisted of 283 cases of naked-eye evidence of tuberculous infection among 1,800 consecutive autopsies and 65 cases of surgical tuberculosis. Of the 283 children autopsied, over 90 per cent died from tuberculosis and the organism was isolated in 183 instances. Of the cases of surgical tuberculosis, 52 strains were isolated from 65 cases. In all, 241 strains were isolated (152, 63 per cent, were human type). Relatively fewer males (13.9 per cent) than females (19 per cent) showed lesions of tuberculosis and from the second year onward the percentage was always higher in females.

Among the 283 cases the site of the primary infection was considered probably to be thoracic (lungs or lymphatic glands) in 61 per cent, most frequently situated in the right upper lobe, which was difficult of explanation. When the primary infection was in the abdomen, bovine bacilli were found in 82 per cent; when in the lungs, human bacilli were present in 97 per cent. One-third of the children with bone and joint tuberculosis had a bovine infection and among all the children with

bovine infection such lesions were 13 times as common as among those with primary thoracic tuberculosis.

Air-borne infection is more common in cities, and 86 per cent of the children with primary thoracic tuberculosis lived in cities.

Thus from the pathological, histological and bacteriological points of view, the primary lung lesion would appear to be, indeed, such and due to direct infection of the lungs through the air passages. We do not deny—and, as a matter of fact, have shown—that in some cases of primary abdominal tuberculosis severe pulmonary lesions may be found, but these are of a secondary nature.

The author feels that in Scotland, in marked contrast to the experience in America and on the Continent, nearly all children with tuberculous lesions in the lungs or tracheobronchial glands die in childhood from tuberculosis. It is possible that the Scots are less resistant than many other races.

In 101 cases (36 per cent) of the 283 coming to autopsy and dying from tuberculosis, the primary lesion was probably in the intestines. In 18 under 5 dying from tuberculosis all had intestinal ulceration. All such cases under 1 year had been fed on cow's milk. The greatest number of primary abdominal lesions were found in the second year of life, that is, at the period when children are consuming large amounts of raw milk. From these abdominal lesions, 12 human and 54 bovine strains were isolated, country children showing slightly more bovine infection, due possibly to the fact that the milk in Glasgow is pasteurized. From children dying from tuberculosis 165 strains were isolated, 73 per cent being human. The greatest percentage



of human strains as compared with bovine was found in the first 6 months of life, and in children from 5 to 13. The highest percentage of infections with bovine strains occurred in the second year of life, when most raw milk is consumed. There was some evidence to show that the bovine was less dangerous than the human strain. Probably both the situation of the primary lesion and the type of bacillus have something to do with the generalization of the disease which occurs more frequently associated with the human bacillus.

This valuable study has added many concrete facts to our still somewhat confused knowledge of childhood tuberculosis. It again emphasizes the importance of the bovine tubercle bacillus in the struggle against tuberculosis. It may be recalled that in 1901 Koch questioned this importance but modified somewhat his views in 1908. In the meantime Ravenel, Griffith and others had shown that for children, at least, the bovine bacillus was very dangerous.

Blacklock adduces convincing evidence that such is the case and even in America it has been estimated that 3,000 to 4,000 children die from the bovine tubercle bacillus annually. For man, Blacklock thinks he has shown that the bovine infection is less pathogenic than the human type but evidence is accumulating that at least in Scotland the bovine bacillus may be found in over 3 per cent of the cases of adult pulmonary tuberculosis, due, Griffith and Munro hold, to a late manifestation of a childhood, bovine, alimentary infection. Such patients rarely, they have suggested, infect others. Apart from the generalized tuberculosis occurring in the children with little resistance, Blacklock found pulmonary lesions are the most dangerous manifestation of tuberculosis. These are nearly always due to the human

bacillus, from aerogenous infection. Bovine infection is more common in Scotland than elsewhere and apparently infantile tuberculosis is almost always fatal. He thinks it is very rare for dormant infection of childhood to flare up later.

It is impossible to give in a small compass the many important and suggestive facts brought out in this work. The book should be carefully studied by all who are engaged in health work and is particularly to be recommended to the workers in tuberculosis.

LAWRASON BROWN

A Standard Classified Nomenclature of Disease—*Compiled by the National Conference on Nomenclature of Disease. Edited by H. B. Logie, M.D., C.M. New York: Commonwealth Fund. 701 pp. Price, \$3.50.*

This book is the product of coöperative effort by national organizations representing medicine, medical statistics, surgery, public health, and industrial hygiene; by the federal medical, health, and statistical services, and life insurance interests.

This nomenclature is a distinct advance over all nomenclatures that have preceded it; and it is a decided departure therefrom in that it provides for the classification of diseases on a dual basis, that is, etiological and anatomical. This makes it possible for hospitals to make statistical accountings of *all* the diseases affecting any organ of the body; and for the first time, hospital statistics showing both the site (except when unknown) and cause (except when unknown) of disease will become available.

The new nomenclature is divided into 11 anatomical divisions and 11 etiological categories. Leading specialists in all branches of medicine have given generously of their time to assist in its preparation. All acknowledge, never-

theless, the outstanding contribution which has been made by Dr. H. B. Logie in originating the dual form of classification and in preparing and editing the manuscript of the book itself.

The *Nomenclature* is to be kept abreast of the progress of medicine. This will necessitate revisions from time to time. For this purpose the National Conference on Nomenclature of Disease will continue to function and an executive staff will be maintained. Headquarters will be at the New York Academy of Medicine which has generously provided office space and working facilities since the Conference began its work.

The reception of the *Nomenclature* by clinical societies and hospitals has been most gratifying. More than twenty of the former have approved it formally. It is now in actual use in 71 hospitals, including many of the largest in the country; and its adoption is being considered by 238 additional hospitals. A number of large hospitals associated with leading medical schools are using it. Among these may be mentioned Harvard, Columbia, Yale, University of Pennsylvania, Western Reserve, Vanderbilt, Tulane, and the University of Chicago. More recently its use has spread to other countries, through its adoption by hospitals in Palestine and the Dutch East Indies.

GEORGE H. VAN BUREN

**The History and Epidemiology of Syphilis**—By William Allen Pusey, M.D. Springfield, Ill.: Thomas, 1933. Price, \$2.00.

Anything from the pen of Dr. Pusey on syphilis is authoritative and written in a style which attracts. The present volume consists of three lectures given under the Adolph Gehrman Endowment, and according to the author, are an elaboration of certain chapters of his monograph on *Syphilis as a Modern*

*Problem*, written in 1915 as a part of the celebration of the Panama-Pacific Exposition at San Francisco. The changes consist chiefly of bringing the material up to date, since much new matter has come to our knowledge in the 18 years which have elapsed since that publication.

The book is written in Dr. Pusey's usual style, succinct and interesting. We have already said that it is authoritative. It is profusely illustrated, with old cuts and 26 photographs of well known men who have taken part in the study of syphilis and the elucidation of the problems presented.

The printing and make-up are excellent.

MAZÛCK P. RAVENEL

**Cancer and Other Chronic Diseases in Massachusetts**—By George H. Bigelow and H. L. Lombard. Boston: Houghton, Mifflin, 1933. 355 pp., 135 tables, 12 charts, and 2 maps. Price, \$4.00.

The shift in age classes in the population due in part to the reduction in infant mortality and to the growth of preventive medicine, is affecting the incidence and amount of chronic diseases to such a degree that the problem of hospital or other care for this group of persons is becoming a social, economic and medical problem of increasing importance.

The population over 50 years of age has increased about 1 per cent in each decade. Deaths from chronic diseases have increased from one-third of all deaths 50 years ago to two-thirds today. The duration of such diseases in persons over 50 years of age has increased 2.6 times in the last 20 years.

The time lost by wage earners due to chronic disease in Massachusetts annually is valued at \$40,000,000. Chronic cases to the number of 55,000 occur annually in that state in homes wholly unable to care for them. This number would require 18,000 hospital

beds and an initial investment of \$55,000,000 for their installation and \$18,000,000 for maintenance, with a net cost to the state after estimated receipts are credited of \$13,000,000—nearly one-third of the present cost of state government.

As alleviating factors, the following proposals are discussed: (1) a program of adult hygiene to be added to that of childhood and adolescence to constitute a health education program in schools; and (2) early diagnosis, especially in cancer. Discriminating short-term medical service is less expensive than indiscriminate long-term service to the ambulant invalid or to society. There are 138,000 cases of rheumatism in Massachusetts, of whom 70 per cent receive no medical care, and of whom 70 per cent could probably be benefitted by proper care.

About 12 per cent, or 500,000, of the population in Massachusetts are victims of chronic disease. Of these, 45 per cent are partially disabled and 5 per cent totally disabled. The incidence is 50 per cent higher among the poor than among the well-to-do.

The order of incidence is rheumatism (138,000), heart disease (84,000), arteriosclerosis (64,000), digestive diseases (29,000), eye and ear (24,000), apoplexy and tuberculosis (24,000 each), diabetes (15,000), and cancer (11,500). The duration varies from cancer at 21 months to rheumatism at 4 years. The fact that rheumatism cripples most and lasts longest makes it of preëminent social, economic, and medical importance. At present two-thirds of this group receive no medical attention. The reasons given for absence of treatment were (60 per cent) lack of confidence in medical treatment, (33 per cent) condition not regarded as serious, and (13 per cent) economic reasons.

The Massachusetts cancer program is reviewed in the light of 5 years' experi-

ence. This provided state-aided cancer clinics and a state hospital for treatment of the indigent and to stimulate more adequate diagnostic and therapeutic service.

The review indicates that the services of the best medical and lay citizens can be obtained to develop and guide a cancer program; that physicians respond to the educational opportunities and their patients to clinics and hospitals; that cancer patients come in large numbers to private agencies when informed; that earlier use of cancer diagnosis follows on importunity; that all methods of public information on cancer must be used unceasingly; and that under government direction clinic and hospital service can be developed of a quality not heretofore available. Similar services should be developed for other important chronic diseases.

This study was made by the Massachusetts Department of Public Health, and is based on a large volume of statistical information elaborated with skill and a notable completeness. Every public health official and worker should be familiar with its findings and ponder over it.

CHARLES A. KOFOID

*The Sanitary Inspector's Handbook. A Manual for Sanitary Inspectors and Other Executive Public Health Officers—By Henry H. Clay. London: H. K. Lewis & Co., Ltd., 1933. 386 pp. Price, \$4.00.*

This is one of the books which give joy to a reviewer. Prepared with the idea of supplying a textbook for students presenting themselves for the examination of the Royal Sanitary Institute and Sanitary Inspectors Examination Joint Board, it necessarily deals with English customs and laws. However, the book is soundly based on fundamentals and each chapter gives the reference to the Public Health Acts involved. It will not only be of much value to students in England and

Scotland, but to those in the United States, while every public health officer will find practical, sound sense based on fundamentals which are as true for America as they are for the British Islands. For example, early in the volume a chapter is given to "Powers of Entry." These powers are based on common law, as we understand it, but necessarily the statutes in England are different from those in our country.

From cover to cover the book is full of sound information which will be of great value to inspectors or health officers in this country and elsewhere as well as in England. In spite of these drawbacks, as they may be called, for the American reader, the book can be unreservedly recommended to all of those interested in inspection and enforcement of sanitary law.

It is excellently printed and well illustrated. There are chapters on vital statistics, useful memoranda and glossary of building terms, tables of measurement with their equivalents in different systems, etc., all of which add to the convenience of the reader.

MAZYCK P. RAVENEL

#### Everyday Problems in Health—

*By Frank Merrill Wheat and Elizabeth T. Fitzpatrick. New York: American Book Company, 1933. 144 pp. Price, \$1.20.*

"A basic text planned for the scientific teaching of pupils either in junior or senior high schools" is a concise but inadequate description. My own description from a purely human point of view would be, "an absorbing book, presenting vividly subject matter of interest to every human being."

The book of 440 pages, including appendix, glossary and index, is not only an excellent basic text, logically arranged and carefully checked, but is also an unusually challenging presentation of problems of biology, public

health and social relationships common and vital to everyone.

Divided into five units, Health and the High School Pupil, Eat and Live Healthfully, Putting Food to Work, The Control of the Healthy Body, Maintaining a Healthful Home, each unit is subdivided into Problems which cover a large range.

The book is written for high school students and is presented by authors who have such a keen interest and love of the human animal, not as a cut and dried subject, but rather as a living and thinking organism, that it seems inevitable that physiology, biology, and everyday living will be real and vivid experiences instead of lessons to be learned laboriously and perhaps distastefully.

This book meets a long felt need in high schools and will, I am sure, call forth from teachers and parents the remark which it called forth from me—"At last a health text which will bring results in better living."

JULIA B. TAPPAN

#### The Health School on Wheels—

*By J. Mace Andress and I. H. Goldberger. New York: Ginn, 1933. 399 pp. Price, \$.76.*

If any book can arouse the interest of children in public health, *The Health School on Wheels* should do it.

There is nothing new in the idea of sightseeing tours of a city, but to adapt them to one class of school and to specialize in the health promoting agencies of a large city is a suggestion with real merit. It may not be that every class which uses this book as a text can study at first-hand the aspects of community health as the children do in the story—in fact, relatively few cities have all the opportunities afforded by "Brightville." However that may be, the desire to know more about what is going on along this line should certainly be created.

The suggestions for newspaper publicity talks by city officials, school health leagues, public boards, and illustrated notebooks may well play a part in the activities of the class just as they do in the story.

Any wide-awake teacher will find this book a valuable guide full of helpful ideas for civic instruction. Health officers can use it to good advantage in planning demonstrations of what their departments do. Popular interest and coöperation are essential, if public health work is to be at its best.

JOHN HALL

**Infants and Children: Their Feeding and Growth**—By *Frederick H. Bartlett, M.D.* New York: Farrar & Rinehart, 1932. 409 pp. Price, \$1.50.

This is one of the best books of the sort that I have come across. In the first place the format is good. Then it is possible to find things in it: it has an excellent table of contents and a comprehensive index. It is written in an agreeably personal style without the *ex cathedra* attitude which is so characteristic of some books written for the laity. The intelligent mother can read it without irritation. It goes into considerable detail, with enough repetition to drive home the point but without wordiness.

One of the best chapters of the book is on Habits. Some very sane advice is given there which ought to alleviate the anxiety of a certain type of parent. The emphasis laid on prevention is most commendable. In the chapter on Emergencies, however, the paragraph on Dogbite is inadequate in view of the prevalence of rabies and sentimentality in this country. In the chapter on Feeding, on pages 46 and 47, there is a slight inconsistency in the recommendation regarding the use of egg yolk. Again, the wording of the reference regarding the use of evaporated milk

gives the impression of over-conservatism, perhaps.

All in all, this manual can be recommended unreservedly for the use of any mother who takes her job seriously.

MERRILL E. CHAMPION

**A Study of Rural Public Health Services**—By the Sub-Committee on Rural Public Health Work and the Committee on Administrative Practice of the American Public Health Association. Allen W. Freeman, M.D., Editor. Published by the Commonwealth Fund of New York. 233 pp. 84 tables. 6 ill. Price, \$2.50.

This authoritative book on rural public health services in the United States and Canada is the first comprehensive review of the subject to appear in the literature of rural public health administration. It will be welcomed as a companion volume to earlier publications covering similar studies for city, state, and provincial health departments.

In the development of a tentative appraisal form for rural health organizations in 1927 the need for more accurate and basic knowledge of rural health services became apparent. The Committee on Administrative Practice of the American Public Health Association decided to undertake such a study, and a sub-committee was appointed. Financial assistance was secured through the Commonwealth Fund, and the detailed planning of the survey began in 1928. Dr. C. B. Crittenden's services were secured for personally surveying 27 typical organized and 19 unorganized counties in 28 states and 2 Canadian provinces. Furthermore, to provide a check on the representative character of the data collected for surveyed organized counties, 467 county and district whole-time health organizations were circularized with questionnaires to be filled in as for the year 1929, and

337 of those returned were analyzed. In the text the former group of counties are referred to as "surveyed counties" and the latter as "coöperating counties."

The preface to this volume is an excellent introduction to the report and will repay careful study. The first chapter is a summary of the main points of interest disclosed, and the second chapter is devoted to the background of the survey. In the thirteen chapters which follow attention is given to matters of organization, health services performed by the state, personnel, expenditures, communicable disease control, maternity hygiene, infant and preschool hygiene, school hygiene, general sanitation, and health instruction. The material for these chapters is discussed separately for the surveyed group and the coöperating group of counties.

The average area of the surveyed counties in the United States was approximately 1,100 square miles; the average population was nearly 38,500; and the average density of the population was 35 persons per square mile. More than 61 per cent of the total population of the 44 American counties surveyed was rural, and 36.4 per cent was rural farm population. Only 8 of the 44 counties had a per capita income in 1925 greater than the \$750 average for the United States, and nearly one-fourth of the coöperating counties included in this study had an average per capita income of less than \$200.

Only one-fourth of the surveyed counties had a separate board of health. Organized counties of the surveyed group had 1 nurse per 12,500 population. In unorganized counties there was 1 nurse per 16,000 persons, and in

coöperating counties 1 nurse for 16,500 persons.

In the surveyed group the average annual expenditure for organized counties amounted to \$18,748 or \$.475 per capita. This was 1.5 per cent of the total cost of county government. For unorganized counties surveyed the total cost was \$6,380. In the coöperating counties the average annual expenditure per county was \$12,060 or \$.378 per capita.

. . . The solution of the problems of the rural health administration in the United States seems to depend upon the extension of the system of county health departments. Such county health departments must be staffed and financed more adequately than at present, and the position of county health officer must be made to offer a satisfactory career to young and well trained physicians who wish to make of health administration a life work.

The report should be of special interest and value to local rural health workers and directors of divisions of local rural health administration of state and provincial departments of health. To those actively engaged in rural health work it will contribute to breadth of vision, awaken interest in the character of information which should be collected and analyzed periodically for each unit, suggest indices for evaluating health services in terms of activities, and in general help to coördinate the separate units of the rapidly growing rural health administration movement.

Readers of this excellent report will be grateful to the American Public Health Association, the Commonwealth Fund, and to all others who have participated in its accomplishment for the high character of the services rendered.

W. A. McINTOSH

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Seasonal Conjunctivitis**—The deep South adds a new sanitary problem to the long list of its health services in the eradication of "eye-gnats" and the resulting "gnat eye disease." Adequate garbage and feces disposal combined by a simple treatment are the indicated preventive measures easier to enumerate than to apply.

BENGTSON, I. A. Seasonal Acute Conjunctivitis Occurring in the Southern States. *Pub. Health Rep.* 48, 31:917 (Aug. 4), 1933.

**The Troublesome Typhoid Carrier Problem**—Typhoid carriers of over a year's duration, in whose bile are found the bacilli, may well have the operation for the removal of the gall bladder at public expense, for it is cheaper and more effective than subsidy. In the Massachusetts series reported, stones were found in all carriers and the symptoms associated with the condition were relieved.

BIGELOW, G. H. and ANDERSON, G. W. Cure of Typhoid Carriers. *J.A.M.A.* 101, 5:348 (June 29), 1933.

**When Thirty Days Is Too Long**—Uncomplicated cases of scarlet fever may be terminated on the 21st day with but little, and on the 25th day with no more, danger to the community than on the 30th day. Complicated cases should be isolated until cleared up. Isolation for 7 days after the end of contact should be enforced.

BREST, W. H. A Study of Secondary Cases of Scarlet Fever. *New York State J. Med.* 33, 14:881 (July 15), 1933.

**Penalties for Being Fat**—Physical impairments in a group of men, including both underweights and overweights, correspond in incidence to previously established mortality rates due to the same conditions. On the underweight side we have tuberculosis out-

standing, and on the overweight side are the degenerative conditions indicated by urinalysis findings and high blood pressure.

BRITTEN, R. H. Physical Impairment and Weight. *Pub. Health Rep.* 48, 31:926 (Aug. 4), 1933.

**Getting Action in Health**—Exactly what, and who, and how to tell the story of health is the burden of this discussion of health education.

BROWN, B. Mass Education. *Milbank Quart. Bull.* 11, 3:163 (July), 1933.

**Scarlet Fever Immunity Lasts**—Eight years after they were immunized, 50 formerly Dick positive children were retested. Thirty-two were still Dick negative while 18 were slightly positive.

BULL, H. G. Report on a Group of Fifty Children Dick Tested Eight Years After Immunization Against Scarlet Fever. *J.A.M.A.* 101, 5:363 (July 29), 1933.

**Encouraging Increase in Treated Syphilis Cases**—In 1927 prevalence surveys indicated that 643,000 cases of syphilis were constantly under treatment. Now it is estimated that 423,000 fresh cases are gathered in for treatment each year, and an equal number are beginning treatment for infections of long standing. An upward trend in this curve is considered encouraging.

CLARK, T. and USILTON, L. J. Trend of Cases of Syphilis Under Treatment or Observation in the United States. *South. M. J.* 26, 8:722 (Aug.), 1933.

**Doctoring the British Tommy**—A symposium of varied opinions on the proposal of a general medical service for Great Britain which now spends 200 million pounds per annum. The preventive angle is much in evidence.

Cox, A. *et al.* A General Medical Service for the Nation. *J. Roy. San. Inst.* 54, 2:52 (Aug.), 1933.

**Raw Milk and Streptococci—**Another milk-borne outbreak of scarlet fever is reported. The 57 cases of scarlet fever and 38 cases of sore throat were the result of a streptococcal udder infection in a cow. The milk, of course, was not pasteurized.

FEEMSTER, R. F. and KINGSTON, J. M. A Scarlet Fever Outbreak Due to Raw Milk. *New Eng. J. Med.* 209, 6:275 (Aug. 10), 1933.

**Vitamin A Supplements Not Needed—**"In the course of an observational period of 5 months, frequent respiratory infections developed . . . among those receiving vitamin A to the same extent as among the control group. . . . There is no clinical basis for designating vitamin A the 'anti-infective vitamin.' . . . Our dietary is not deficient in vitamin A."

HESS, A. F. *et al.* Does Our Dietary Require Vitamin A Supplement? *J.A.M.A.* 101, 9:657 (Aug. 26), 1933.

**Tuberculin Testing of Rural Youngsters—**In a rural community like Cattaraugus County, the infrequency of tuberculosis in elementary grade school children makes the routine adoption of the expensive and time-consuming tuberculin test seem unwarranted. It is desirable among all high school students and contacts of diagnosed cases.

KORNS, J. H. Tuberculosis in Children. *Am. Rev. Tuberc.* 28, 2:251 (Aug.), 1933.

**Where Public Health and Medical Practice Meet—**How "ruggedly individualistic" are the present provisions for medical service? In New York State two-thirds of all hospital beds are tax supported, 15 per cent of the population receive medical care from public funds; most mental and tuberculosis, and half the venereal, cases are treated at public expense, not to mention the crippled child, the school medical services and a horde of other clinic patients.

PARRAN, T. Public Medical Care in New York State. *J.A.M.A.* 101, 5:342 (July 29), 1933.

**Cockroaches May Spread Tuberculosis—**The cockroach, a scavenger insect that inhabits our kitchens, crawling over and eating our food, should not be overlooked as a possible mechanical carrier of tuberculosis, says this author who fed the insects on tuberculous sputum and recovered the bacillus in the intestinal tract and feces.

READ, H. C. The Cockroach as a Possible Carrier of Tuberculosis. *Am. Rev. Tuberc.* 28, 2:267 (Aug.), 1933.

**Truth in Cancer Propaganda—**Urging the medical profession to assume an increasing responsibility in cancer control (to forestall more state administrative projects like that in Massachusetts), the author makes several candid statements not usually found in cancer prevention propaganda. For instance, "Probably 50 per cent of the present deaths from cancer could be prevented if treatment was undertaken in time." This is much nearer the truth than our usual "cancer is curable" sloganeering.

RECTOR, F. L. Present Day Cancer Problems. *J.A.M.A.* 101, 9:672 (Aug. 26), 1933.

**Lungs Damaged With Silica Dust—**Silicosis is discussed from several angles, symptoms, etiology and post-mortem and roengenographic findings, making the symposium of especial value to the industrial hygienist.

SAYERS, R. R. The Clinical Manifestations of Silicosis. *J.A.M.A.* 101, 8:580 (Aug. 19), 1933.

**Inherited Cancer Susceptibility—**Twenty-three years' experience, involving over 116,000 mouse autopsies, leads to this conclusion: "The genetic difference between cancer susceptibility and cancer insusceptibility involves one



gene; that is, they are unit characters . . . cancer susceptibility behaves like a recessive, insusceptibility like a dominant."

SLYE, M. The Relation of Heredity to Cancer Occurrence as Shown in Strain 73. *Am. J. Cancer* 18, 3:535 (July), 1933.

**Progress in Pediatrics**—Skimming over the topics discussed at the 50 annual sessions of the Pediatric Section of the A.M.A., the author reminds us how really youthful are the modern ideas of infant hygiene. The extent of the progress in so short a time should encourage all health workers.

SCHULIZ, F. W. The First Half Century of the Section of Pediatrics. *J.A.M.A.* 101, 6:417 (Aug. 5), 1933.

**Tuberculosis Knowledge and Programs Questioned**—How far this dark view of the tuberculosis situation

in England applies to the American scene is not known to this reviewer. But if half his criticism of present methods and present knowledge is true of us, we are in far too complacent a mood.

VARRIER-JONES, P. Tuberculosis: Why It Is Still a Problem. *J. State Med.* 41, 8:435 (August), 1933.

**Breast Feeding and Future Health**—Wet powder for the propagandist's guns is this conclusion: The breast-fed infant is not more resistant to disease in childhood than the artificially-fed baby, and the general health of the school child cannot be determined by the method of feeding during infancy. As one would suspect, this is British candor in all its gloomy honesty.

WILSON, J. G. Infant Feeding and Its Relation to the Health of the School Child. *Pub. Health* 46, 11:356 (Aug.), 1933.

## BOOKS RECEIVED

THERAPEUTIC USES OF INFRA-RED RAYS. By Annandale Troup. 2d ed. London: The Actinic Press, 1933. 90 pp. Price, \$2.00.

SAFETY FIRST FOR LITTLE FOLKS. By Lillian M. Waldo. New York: Scribner, 1933. 165 pp. Price, \$.64.

TO BE OR NOT TO BE. A Study of Suicide. By Louis I. Dublin. New York: Harrison Smith & Robert Hass, 1933. 443 pp. Price, \$3.50.

GROWING INTO MANHOOD. By Roy E. Dickerson. New York: Association Press, 1933. 100 pp. Price, \$1.00.

FETAL, NEWBORN, AND MATERNAL MORBIDITY AND MORTALITY. White House Conference on Child Health and Protection. New York: Appleton-Century, 1933. 486 pp. Price, \$3.00.

HOW TO STAY YOUNG. By Robert Hugh Rose. New York: Funk & Wagnalls, 1933. 195 pp. Price, \$1.50.

FOOTBALL PLAYS FOR BOYS. By Ralph Henry Barbour and La Mar Sarra. New York: Appleton-Century, 1933. 110 pp. Price, \$1.25.

PUBLIC HEALTH NURSING IN INDUSTRY. By Violet H. Hodgson. New York: Macmillan, 1933. 249 pp. Price, \$1.75.

NERVOUS BREAKDOWN: ITS CAUSE AND CURE. By W. Beran Wolfe. New York: Farrar & Rinehart, 1933. 240 pp. Price, \$2.50.

SANITARY MILK HOUSES. Plans and Construction Details. (1933 Edition.) Published by the Portland Cement Association, 33 West Grand Ave., Chicago, Ill. Free upon request.

## NEWS FROM THE FIELD

### WHOLE TIME HEALTH OFFICERS

ACCORDING to a directory published by the U. S. Public Health Service, in *Public Health Reports*, July 14, nearly 600 counties in the United States have health officers who devote their entire time to their official duties. In several states, groups of counties, varying from 2 to 10, are combined in districts with one health officer. Kentucky, which has 120 small counties, has 81 health officers; Alabama, with 67 counties, has 52 full-time health officers; Ohio, with 88 counties, has 44 health officers; and Tennessee, with 95 counties, has 40 health officers. In New York, only 4 counties have health service organized on a county basis, with full-time officers.

### MISSOURI WATER AND SEWERAGE CONFERENCE

THE Ninth Annual Missouri Water and Sewerage Conference was held on September 22 and 23, in Jefferson City, Mo. The Missouri Public Health Association, A.P.H.A. Affiliate, met jointly with them on September 22 and 23. Among the speakers was Henry F. Vaughan, D.P.H., Commissioner of Health of Detroit, and Life Member A.P.H.A.

### GORGAS MEMORIAL ESSAY CONTEST

THE Gorgas Memorial Institute of Tropical and Preventive Medicine has awarded the Maryland State prize for this year to Margaret M. Harrison, Baltimore, a student at the Roland Park Country School. The subject of the essay was "The Problem of Mosquito and Other Insect Life in Relation to Sanitation, Health and Industry."

### COURSE FOR HEALTH OFFICERS

THE Albany Medical College, in coöperation with the New York State Department of Health, offers an extension course to qualify physicians for appointment as health officers of towns under 50,000 population. The course began September 1 and will continue until June.

### DEATH

EDWIN W. KOPF, formerly Assistant Statistician of the Metropolitan Life Insurance Company, and F.A.P.H.A., died on August 3, at the age of 45.

## PERSONALS

DR. GEORGE H. BIGELOW, F.A.P.H.A., Commissioner of Health of Massachusetts since 1925, has resigned to become Superintendent of the Massachusetts General Hospital, Boston, effective October 1. He succeeds Dr. Frederick A. Washburn, who is retiring.

DR. HENRY D. CHADWICK, tuberculosis controller of the Detroit Health Department since 1929, has been appointed Commissioner of Health of Massachusetts, to succeed Dr. Bigelow.

DR. JOHN J. PHAIR, formerly bacteriologist of the Cincinnati Department of Health, has been appointed to the staff of the International Health Division of the Rockefeller Foundation. He will be at the Research Center for Undulant Fever, Montpellier, France.

## CONFERENCES

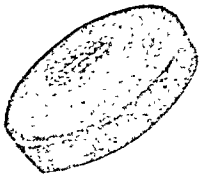
October 9-12, Sixty-second Annual Meeting of the American Public Health Association, Indianapolis, Ind.

November, Seventh American Scientific Congress, Mexico City.

November 3, Mid-year Meeting of the New York State Association of Public Health Laboratories, Albany, N. Y.

February 5-9, 1934, Third International Heating and Ventilating Exposition, Grand Central Palace, New York, N. Y.

March 29, 30, 1934, Annual Meeting of the American Association of Pathologists and Bacteriologists, Toronto, Ont., Canada.



## A DIFFERENT and BETTER SHAMPOO

DERBAC (Silver package), used with the special DERBAC Metal Comb, has been for years the most successful remedy for pediculosis and dandruff. Send 10¢ for 25¢ size professional cake (10 shampoos).

CEREAL SOAPS  
CO., INC., Dept. A-10,  
334 E. 27th St.,  
New York

**Derbac**

Speed SHAMPOOS

**Kellogg's**  
**ALL-BRAN**  
RELIEVES  
CONSTIPATION

## NEW PRICE

## NEW PLANS

\$2.50 a year is the new subscription price of the

## JOURNAL OF HOME ECONOMICS

The Journal will continue as a monthly for the remainder of 1933 but in 1934 it will become a ten-issue magazine, omitting the July and August numbers.

An authoritative up-to-date interpretation of progressive home economics is now more than ever necessary. It is an essential for the home economist; it is necessary as a guide for all who are active in fields of work related to home economics; it is necessary as an interpreter for all who wish to cooperate in explaining to the public the special services and value of home economics in a modern world.

*The Journal of Home Economics fills these needs.*

\$2.50 a year. Sample copy free if you mention the American Journal of Public Health in your request.

Journal of Home Economics  
101 East 20th St., Baltimore, Maryland

## Members and Fellows of the A.P.H.A.

### WHY PAY ANNUAL DUES?

IF you dislike the bother of paying membership or Fellowship dues each year, or

IF you are one of those absent-minded people who have to be reminded again and again of unpaid dues,

IF you are thrifty, Then you should apply for

### LIFE MEMBERSHIP in the A.P.H.A.

Write to the Committee on Fellowship and Membership of the American Public Health Association for information regarding this form of membership.

# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

November, 1933

Number 11

## America's Contributions and Problems in Public Health\*

JOHN A. FERRELL, M.D., DR.P.H., F.A.P.H.A. (*Life Member*)

*President of the American Public Health Association and  
Associate Director of the International Health Division,  
Rockefeller Foundation, New York, N. Y.*

THE term "America" as employed in my paper refers to the countries included in the American Public Health Association, namely Cuba (1902), Mexico (1891), Canada (1884), and the United States (1872). Five annual meetings have been held in Canada, two in Mexico, also a post-convention meeting, and two in Cuba. Canada has supplied five presidents, Mexico two, and Cuba one. The United States, being most centrally located, has furnished the remaining meeting places and presidents. The sixty-second annual session of the Association is being held in Indianapolis. It is the third meeting held in this city.

The first was held in 1882 and the second in 1900. That beloved Canadian, Dr. Peter H. Bryce, who founded the Ontario Department of Health and rendered other valuable services to the cause of public health, presided at the meeting in 1900. It was a historic occasion because Dr. Walter Reed then presented a paper

entitled "The Etiology of Yellow Fever. A Preliminary Note," in which he convincingly established the fact that the mosquito transmits the disease. Thus the way was opened for the rational control procedures that proved to be effective in Havana in 1902, New Orleans in 1905, and Rio de Janeiro in 1908, and made possible the construction of the Panama Canal (1904-1914). The last outbreak in the United States occurred in New Orleans in 1905 and the last in Mexico in the state of Veracruz, in 1922.

After the studies in Cuba and the control work just mentioned, a number of years elapsed before yellow fever was further studied and widely and systematically controlled. Americans, not content with its status, particularly in the equatorial zone, instituted investigative and control measures on an international scale. Mainly through the initiative of the International Health Division of the Rockefeller Foundation, and largely with its funds, these measures have continued for more than 15 years. Among the advances that have been made, I may mention that yellow

\* Presidential Address delivered before the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

fever has been definitely proved to be a virus disease; a successful method of producing immunity and a reliable test of immunity have been developed; erroneous ideas as to the prevalence and distribution of yellow fever and as to the character of measures necessary for its control have been corrected; and the disease has been driven from North America and checked in a number of endemic centers of South America, and systematically studied for several years in South America and West Africa.

It is particularly fitting, therefore, that the feature of this meeting should be a session in memory of Walter Reed and his colleagues at which the historic events relating to yellow fever may be reviewed. The tributes should include Carlos J. Finlay, a Cuban physician, who advanced the theory that yellow fever is transmitted by the *stegomyia* mosquito. Dr. Finlay was president of this Association at the annual meeting held in Havana in 1904.

The indispensable reference book entitled *A Half Century of Public Health*, was published by this Association in 1921. It is one of the important contributions of Dr. Mazýck P. Ravenel that made notable his presidency of the Association in 1921. Seventeen other authorities collaborated with him in reviewing the developments of all phases of Public Health in America for the first 50 years of the Association's existence. Any attempt I might make on this occasion to cover the same ground would be futile.

Moreover, it would be impracticable for me to review all of the important individual and group contributions to the advancement of public health made by members of this Association since 1921. I shall, therefore, limit my discussion to a few of the major movements in the advancement of public health that have been distinctively American.

During the period 1850 to 1900,

the discovery of the causal organism of one disease after another was laying the foundation for scientific medicine and public health. The list of discoverers was made up mainly of Europeans. However, during the past three decades Americans have been prominent among the discoverers in etiology, serology, and other branches of science that have supplied a basis for developing sound control measures. For about 30 years after a considerable amount of knowledge as to the etiology of various diseases became available, there was apathy on both sides of the Atlantic in applying this knowledge. Finally, however, the movement got under way in America. The early steps were characterized by the establishment of boards of health (Massachusetts 1869; California and Virginia 1871; District of Columbia 1870). New York City's Department of Health was established in 1866 and by 1873 there were 134 cities which had some form of health service.

However, bacteriology did not generally afford a foundation for sound, scientific control procedures until the beginning of the present century, although New York City established a vaccine laboratory in 1874, Providence a diagnostic laboratory in 1888, and New York City a laboratory for diagnosing tuberculosis in 1893 and diphtheria in 1895. The production of antitoxin in the New York City laboratory in 1895 led to the first real check of a diphtheria rate which for years had been steadily rising. A drop of 33 per cent in the death rate in one year from diphtheria in New York City was an event of historic significance. From 1900 on America has steadily gained ground as a leader among the nations in the application of knowledge to the control of disease.

Through its effort at popular education of the masses in matters of hygiene and public health, America again has ex-

cited the interest and respect of health authorities of other countries. The official health agencies have established their educational divisions which have utilized the printed pages of magazines, newspapers, bulletins, and leaflets. The radio has been extensively employed. School teachers have been instructed. Courses in hygiene have been given in colléges, high schools, and grammar schools. Manufacturers and merchants have used labels and advertisements to capitalize the popular interest in health practices. The health officer, nurse, and inspector have carried the gospel of health to the home, the school, and the clinic. This movement in many localities has been stimulated and even initiated by nonofficial health organizations. Many of the European health officials visiting in the United States and Canada have been deeply impressed by the extent to which information about hygiene and public health has been disseminated among the masses. In popularizing public health knowledge this Association and its membership have made an important contribution.

Another American contribution to public health progress has been the private or unofficial health agency. In the United States alone there are probably over 100 of these agencies operating on a nation-wide basis. Most of them have a special interest or problem, which may be a single disease, as is the case with the National Tuberculosis Association, or a group of diseases, as in the program of the American Social Hygiene Association; or a particular age group, as the American Child Health Association. There are national organizations for the conservation of vision, for the promotion of mental hygiene, and for many similar objectives. These organizations have state and local branches.

Again, there are foundations either operating in the health field or supply-

ing funds for such work to other, usually governmental, health organizations. Certain ones do both. In connection with our foundations and other philanthropies, I might state here that large gifts of money for the advancement of all phases of public health were first made by Americans.

These various unofficial agencies have coöperated with the official agencies by supplying some of the funds for special activities, such as research, demonstrations, and training. They have encouraged the employment of professional personnel, the enactment of progressive legislation, and provision of increased health appropriations. When they have inaugurated new services, they have been glad, as a rule, to have the governmental organizations assume as quickly as possible complete administrative and financial responsibility for the maintenance and expansion of the work. Many of the projects were experimental in character and could not in the beginning have been financed with public funds. Thus the official health organizations have been stimulated, aided, and enlarged by these private agencies, and many advances in knowledge and practice have been developed much sooner than would have been possible had the official agencies been working alone.

Although the influence of the voluntary health agencies in the advancement of public health in North America has been great, a question has arisen as to whether their existence may not at times have afforded too great a feeling of safety, thus delaying appropriations for the official agencies and retarding their growth. The reverse opinion is commonly held in public health circles, but no one will deny that there may have been instances when a personally ambitious employee of a private agency may unwittingly or unwisely have worked in competition with the official organizations, but such conduct cer-

tainly would not have the approval of a recognized national, unofficial, health association.

America has contributed the university school of public health. Certain universities, colleges, and medical schools had previously offered courses in preventive medicine and public health. But we are referring to definite schools with faculties concentrating on the field of public health and with courses and teaching organized entirely from the public health point of view. In this class may be mentioned the School of Public Health of Harvard-Technology, which admitted its first class in 1914 and operated through the school year 1920. Johns Hopkins University School of Hygiene and Public Health admitted its first class in 1918. This was followed by the Harvard School of Public Health in 1922 and the University of Toronto School of Hygiene in 1927. Other schools or institutes of public health have since appeared in various countries. In establishing schools of public health on a plane corresponding with other professional schools, such as medicine, law, and engineering, America has definitely advanced the cause of public health.

In developing a fruitful method of study, Dr. Charles V. Chapin made a notable contribution to the advancement of knowledge and to its application which is a credit to America. During the long period in which he supervised health work in Providence, incidental to the effective conduct of routine activities, he carried on studies regarding the efficacy of measures for dealing with infectious diseases and introduced new practices based on new knowledge. He was the first to discontinue the ineffective and expensive practice of terminal disinfection and to direct health measures against persons rather than things. I have singled him out because he introduced a scientific method of appraisal which has enabled

all competent health officers systematically to improve the quality of their services.

For the health protection of its population America in general provides a safe supply of water and milk. In all populous centers and even in towns of from 1,000 to 5,000 population, the water supply is chlorinated and otherwise treated to make it safe. In all cities and larger towns milk is obtained from tuberculin-tested cows and is pasteurized. Its production and distribution are made to conform to the standards recommended by this Association. The same standards of safety are enforced on the common carriers and in other interstate traffic.

The difference between the bacilli of bovine and human tuberculosis was discovered in 1896 and 1898 and the transmissibility of bovine tuberculosis to man was discovered in 1902, both discoveries being made by Americans. Subsequently systematic control measures have contributed greatly toward diminishing bovine tuberculosis in America and toward making our milk supply safe. Health officers, sanitary engineers, bacteriologists, chemists, and veterinarians have all shared in these notable achievements. There are few places in the world where the traveler on train or boat, and in hotels and restaurants can eat and drink with as much safety against enteric and other diseases as in Canada and the United States. The chlorination of water and the pasteurization of milk are among the distinct advances in health practice which were first extensively applied in America.

The sanitary engineer has become an indispensable part of all well-rounded health organizations. Degrees in sanitary engineering have been awarded for many years by university schools of engineering which have organized courses designed to equip the sanitary engineer for the wide range of activi-

ties in his field: Practically every state, province, and city is now employing in its health department one or more graduate sanitary engineers. The engineer functions mainly in the field of environmental sanitation. In designing, building, supervising, or passing upon plants for purification of water and for the sanitary disposal of sewage; in matters of drainage, housing, dairying, and ventilation, he plays a very important rôle. He has many achievements to his credit and his work in America has been observed with interest by health authorities from other quarters of the globe. Sanitary engineers have their own society and through their own section are active in the work of this Association.

Public health nursing, which has become a vital factor in the conduct of public health work, is also essentially an American movement. Its influence in the public health field is fairly recent, but the growth has been rapid. Already public health nurses far outnumber any other class of health personnel in the field services of official and voluntary health agencies. The range of health activities in which they participate is extremely broad, and the quality of the service which they render is rising steadily.

The leadership in the public health nursing movement has been aggressive. Competent supervisors who direct and teach the field nurses have served to increase efficiency. Foremost among the achievements has been the establishment of persistently rising eligibility standards. University courses in public health nursing have been established, and the number of students taking the courses has steadily increased. Public health nurses have their own organization and journal. Through the section on public health nursing they share in the activities of this Association. In the development and extensive utilization of the public health nurse in the

health field, America has been a pioneer.

The important movement toward the establishment of local health service during the past two decades has been of American origin. After the new era for applying modern knowledge to the conservation of human health was well under way in the urban areas, attention was turned to the balance of the country which embraced the towns, villages, and sparsely-settled areas.

Between 1910 and 1915 the warfare against hookworm disease, typhoid fever, and other filth-borne diseases led logically to a movement to supply non-urban areas with creditable full-time health services, usually in the shape of full-time county health units. As was the case in urban organizations, the health officer, nurse, and sanitary inspector conducted the field activities. Except for a few of the stronger county organizations serving both urban and rural areas, the technical experts for laboratory, sanitary engineering, epidemiological and other services have been supplied to the local organizations by the state health departments which frequently likewise furnished administrative and financial coöperation. This movement has steadily gained ground until it now embraces nearly 20 per cent of the counties and 35 per cent of the non-urban population of the United States. In Canada and Mexico the movement has also made striking headway, which will be reported at this convention in the Health Officers Section by health officials from each of these countries. Its logical extension to a basis of adequacy will occupy the public health forces for many years to come.

In seeking to make health work a full-time, professional occupation for all classes of health workers—administrative and technical—the American Public Health Association and the American universities have set a high standard. In 1922 the Association definitely de-



cided that it was to be an organization of professional health workers and not merely a popular health association with a large part of its membership composed of persons not actually engaged in or even indirectly identified with health work. Since that time a Committee on Fellowship and Membership and another on Training and Personnel have furthered the movement for professional standards. The Committee on Training and Personnel encouraged the unification of public health courses and degrees and published a directory of professional health workers. A year ago the committee was reorganized, its name changed to the Committee on Professional Education, and its scope broadened. Among the new lines of activity which the committee contemplates adding to the existing program is the promotion of state and national eligibility standards in regard to training and experience for the positions in health organizations.

In legally requiring a diploma or certificate in public health for its medical officers of health, Great Britain has taken the lead, but in many countries health service is regarded as a part-time occupation for which special training is not usually required. In America the full-time principle has been established in national as well as in progressive state, city, and county health services, and the percentage of health workers who have taken special training for their duties is steadily increasing. Although the progress thus far made must be regarded as an important contribution, I shall later on in this paper have to list the completion of this task as one of America's important problems in public health.

Among the contributions of this Association, its standard methods take a high place. First came a standard method for the differentiation of bacteria, adopted in 1898. Next came the

standard methods for the examination of water and sewage. Then followed standard methods for the examination of milk in 1910, of air at about the same date, for the pasteurization of milk in 1920, and finally, through the Committee on Administrative Practice, standard methods or forms for the survey and appraisal of state, city, and county health organizations.

Through the efforts of members of this Association, there has been published by the U. S. Public Health Service during the past decade a survey of the health departments of the 100 largest cities of the United States, a survey of the state and provincial departments of health, and other publications which afford the health executives guidance in modern methods of organization, administration, and practice.

Each standard method has been prepared by the most expert talent available in the membership of the Association. Each has embraced the newest and most reliable information on advanced practice to be found anywhere in the world. From time to time as new knowledge and experience warranted, each standard method has been revised and brought up to date. In this way the Association has supplied the health workers in its membership, and indeed those of the world, with sound, reliable methods for carrying on their work. The contribution of Standard Methods by this Association has been of fundamental importance in the advancement of public health.

The American Public Health Association embraces every important administrative and scientific subject closely related to hygiene and public health. The scope of its activities has greatly expanded during the 62 years of its existence. Knowledge of bacteriology reached a point in 1899 which warranted the formation of a section, which concerned itself with bacteriology

and chemistry. Later this became the Laboratory Section.

Prior to the formation of sections, the meetings as a rule were made up of general sessions. The subjects of the papers to a large extent reflected the particular interests uppermost at the time in public health circles. In the early period before the mode of spread of diseases was established, attention was too often directed to things rather than to persons. Odors, such as that of sewer gas, for example, that now would be classed merely as nuisances, were of deep concern. An epidemic of cholera, yellow fever, or plague naturally caused much excitement and confusion.

The special interests of groups in each division of the health field led gradually to the formation of other sections until, as you have no doubt noted from our program, there are now 10 sections. In order to cover the present wide range of health subjects of vital interest, there is a program for each section, and besides there are general sessions for subjects too broad or too urgent to be left to a single section. The development of such an organization for the advancement of public health on a broad and comprehensive scale is in itself an important contribution to the cause of public health.

The Chairman of the Executive Board will present at this convention a detailed report of the past year's work of the administrative and clerical staffs of the Association, and of the status of membership, finances, and activities of the committees. Beyond casual references, it will not be necessary or feasible for me to dwell upon these topics. Moreover, as this brief presentation of twelve of the major movements in the advancement of public health in America has practically consumed the time at my disposal, I regret I cannot mention many notable contributions to public health that have been made by individual members, committees, or

agencies affiliated with this Association. I must not, however, close this paper without calling to your attention a few of the most vital problems which challenge the best efforts of this American Association.

The restoration of health appropriations and salaries, at least to the pre-depression status, and the reemployment of qualified personnel now unemployed are urgent problems. Losses in funds for public health and in personnel that had occurred before the close of 1932 were distressing but the climax of the depression with its panic and hysteria was not reached until the early part of 1933. Then in at least five-sixths of the states and provinces legislatures convened and often the slashing of appropriations for all purposes was carried on indiscriminately. Although reductions for health services seldom, if ever, exceeded those for other governmental purposes, and in many cases were much less, some states, nevertheless, were left with a bare skeleton of the essentials of an adequate health service. To omit measures for the protection of health at a time when government in all its branches is having to appropriate stupendous sums for emergency relief is extremely illogical. It is the result of fear or panic and not of sound reasoning. The extent of the reduction in health appropriations varies widely. In a few states and cities it has not exceeded 10-15 per cent, but in many others it has been as much as 60-75 per cent. Now that a basis for calm consideration of corrective measures seems to have returned, the public health forces should inaugurate a campaign calculated to lead taxpayers and their representatives on appropriating bodies at least to put the public health status back to where it was prior to the depression.

In spite of the progress already made, the professionalization of public health personnel remains a vital problem for

America. The extent to which routine, administrative, and investigative problems can be handled by competent, professional workers will determine to a large degree the progress to be made by the health forces. The excellent committee assigned to this problem hopes to give guidance to the public and particularly to boards of health and executives as to suitable eligibility standards for personnel. Moreover, it seeks to be helpful to colleges and universities in laying out courses for the various types of service, and to aid those desiring to take special training. With the necessity for professional training recognized in all circles, and with a reserve of qualified personnel available so that any excuse for employing untrained persons is removed, the future advancement and efficiency of health service should be assured.

Another problem to which the Association has definitely committed itself is the enlargement of knowledge and the perfecting of technical methods. A major committee on research and standards is already functioning. It seeks to stimulate research by individuals, groups, and agencies, to keep the standard methods of the Association up to date, and to promote the development of other standard methods as occasion warrants. The acquisition of new knowledge, the supplementing and rounding-out of present knowledge, and the dissemination of the knowledge we already have for the use and guidance of health organizations constitute a problem of the first magnitude, which should engage all resources that can be enlisted.

The wider and more intensive application of knowledge already available is a major task confronting the health forces. It involves the development of health organizations, the securing of appropriations and legislation, the formulation of programs, and the conduct of field operations.

The work must be productive and efficiently carried on if the health authorities are to be guided and if the confidence of the taxpayer is to be held. In this field of administrative practice the Association already has at work a large committee of authorities and a full-time staff. The work, which has been curtailed because of a reduction in income, includes nevertheless many admirable achievements, among which may be mentioned the health conservation contests for cities and the surveys of many health departments of states, cities, and counties. To carry forward effectively this work in the field of public health administration is a task to which the Association, individuals, and corporations may well give aid.

The publications of the Association constitute the tangible consideration returned to members for their dues. They are the historical record of the administrative, investigative, and lifesaving activities of American health forces. They are the media through which the world can learn of and benefit from American developments in public health. Shortage of funds has prevented the publication of many valuable manuscripts. To enlarge these publications, to make them more adequately supply up-to-date information to the membership of all 10 sections, is a problem which the Association must meet. The item of funds presents a difficult problem. If a large part of the membership dues could be applied to the cost of publications, the matter would be simple. In order to do this, new sources of funds for financing other expenses will have to be found. The Committee on Meetings and Publications, in the face of a serious, financial handicap, has been remarkably successful in holding excellent meetings and in issuing an authoritative and useful *Journal*.

The membership and fellowship of the Association should be enlarged and

the qualification standards for membership and fellowship should be maintained. The fifth major committee, that on Fellowship and Membership, is struggling with this problem. It passes upon eligibility for each class of membership and endeavors to bring into the Association all professional health workers who are eligible. This committee has worked with diligence and intelligence and yet within the past year there has been a falling-off in membership. The following record shows the losses of the past year:

	<i>Members</i>	<i>Fellows</i>	<i>Miscellaneous</i>	<i>Total</i>
August 1, 1932	3,503	857	355	4,715
August 1, 1933	3,159	847	299	4,305
Decrease in number	344	10	56	410
Decrease in percentage	9.8	1.1	10.7	8.6

When, however, we consider the drastic depression, the curtailment of health appropriations, the reduction of salaries (which even before the depression were quite meager), and the actual unemployment of qualified workers, the situation in regard to membership in the Association is gratifying. With the gradual elimination of the untrained political appointees, and those serving on a part-time basis, whose chief interests are in other fields, I believe the Association's membership will embrace nearly all health workers who can qualify for membership.

The final problem to which I wish to invite your attention relates to adequate financing of the important activities of the American Public Health Association. With fellowship and membership limited to professional health workers, and with due consideration for the extremely small salaries in the health field, it is obviously impossible for the members, through dues, to finance all the work which the Association should carry on. The need of an endowment to cover at least a part of the Association's legitimate operating expenses has been discussed from time to time at the meetings of the Governing Council and the Executive Board. The task is still ahead of us. Although the present time may not be auspicious for actually raising an endowment, plans for one should be formulated and systematically carried forward until the objective is attained.

Of the seven important problems presented to the forces of which this Association is composed, the most acute is the one which relates to the early restoration of health appropriations and the reemployment of trained workers so that the notable gains in the field of public health which were made before the depression may be held and systematic progress may again be resumed.

# Committee on Professional Education

THE following tables similar to those published in previous years present the data concerning students registered in schools of public health, and the public health degrees granted in the calendar year 1933.

## COLLEGE ENROLLMENT IN PUBLIC HEALTH COURSES

The number of students enrolled, and Public Health Degrees conferred in the year 1933 in courses requiring at least 1 year of residence, by American and Canadian Colleges, is shown in Table I.

Name of University	TABLE I No. of Students Registered 1932-1933			Degrees Offered	No. of Degrees Granted 1933		
	Men	Women	Total		Men	Women	Total
University of California	1	15	16	A.B. M.A. Dr.P.H.		1	1
Columbia University	4	4	8	M.S. in P.H.	5	2	7
Detroit College of Medicine and Surgery	3		3	Dr.P.H.	1		1
Harvard School of Public Health	22		22	C.P.H.* Dr.P.H. M.P.H.	8 2 11	0 0 0	8 2 11
Johns Hopkins School of Hygiene and Public Health	97	59	156	Dr.P.H. Sc.D. in Hyg. Sc.M. in Hyg. C.P.H.	3 11 1 40	0 2 7 1	3 13 8 41
Massachusetts Institute of Technology	85	15	100	S.B.P.H. S.M.P.H. Ph.D. C.P.H.	13 1 1	0 0 0 9	13 1 1 9
University of Michigan	46	35	81	M.S.P.H. D.P.H.	7 2	9	16 2
University of Minnesota	5	7	12	B.A. M.A. M.S. Ph.D.	3		3
University of Pennsylvania	12	2	14	M.A. M.S. Ph.D.	3 1 1	0 0 0	3 1 1
University of Toronto	12	0	12	M.A. Ph.D. D.P.H.	1 0 10	1 0 0	2 0 10
University of Western Ontario	0	0	0	D.P.H.	0	0	0
Yale School of Medicine	20	10	30	C.P.H. Ph.D. M.S. Dr.P.H.	3 3 0 3	3 1 1 0	6 4 1 3
Total	307	147	454		134	38	172

\* Harvard does not give the C.P.H. as a degree.

## CLASSIFICATION OF PUBLIC HEALTH DEGREES GRANTED IN 1933

The number of persons receiving college degrees by reason of public health courses taken, classified according to the nature of the degree conferred is shown in Table II.

TABLE II

<i>Degree</i>	<i>No. of Degrees Granted</i>	<i>No. of Schools Offering Degrees</i>
Certificate of Public Health	64	4
Doctor of Public Health	9	5
Master of Science in Hygiene	8	1
Doctor of Science in Hygiene	13	1
Doctor of Philosophy	7	5
Bachelor of Science	13	1
Bachelor of Arts	1	2
Master of Arts	8	4
Master of Science	3	4
Master of Public Health	34	1
Diploma of Public Health	12	3
<b>Total</b>	<b>172</b>	

Number of Degrees conferred by American and Canadian Colleges for 1931, 1932, 1933, is shown in Table III.

TABLE III

<i>School</i>	<i>Degree</i>	<i>1931</i>	<i>1932</i>	<i>1933</i>
University of California.	A.B.	4	3	1
	M.A.	0	0	0
	Dr.P.H.	1	0	0
Columbia University	M.S. in P.H.	1	6	7
	Dr.P.H.	0	0	1
Detroit College of Medicine and Surgery	C.P.H.*	..	4	8
	Dr.P.H.	1	0	2
	M.P.H.	13	7	11
Harvard School of Public Health	Dr.P.H.	15	5	3
	Sc.D. in Hyg.	19	12	13
	Sc.M. in Hyg.	3	1	8
	C.P.H.	32	33	41
Johns Hopkins School of Hygiene and Public Health	S.B.P.H.	16	9	13
	S.M.P.H.	2	3	1
	Ph.D.	0	1	1
	C.P.H.	4	0	9
Massachusetts Institute of Technology	M.S.P.H.	4	17	16
	Dr.P.H.	1	3	2
University of Michigan	B.A.	..	..	..
	M.A.	..	1	3
	M.S.	2	1	..
	Ph.D.	..	..	1
University of Minnesota	Dr.P.H.	1	..	..
	M.A.	2	4	3
	M.S.	7	..	1
	Ph.D.	1	1	1
University of Pennsylvania	Dr.P.H.	1	0	..
	M.A.	..	..	2
	Ph.D.	..	..	0
	D.P.H.	13	14	10
University of Toronto	D.P.H.	0	0	0
	C.P.H.	6	2	6
University of Western Ontario	Ph.D.	6	6	4
	M.S.	2	0	1
	Dr.P.H.	2	0	3
Yale School of Medicine		159	133	172
	<b>Total</b>			

\* Harvard does not give the C.P.H. as a degree.

Number of Degrees in Public Health Granted in United States and Canada, 1931, 1932 and 1933:

TABLE IV

Degree	1931	1932	1933
C.P.H.	42	39	64
Dr.P.H.	21	5	9
M.S. in Hygiene	3	1	8
Sc.D. in Hygiene	19	12	13
Ph.D.	7	8	7
B.S.	16	9	13
B.A.	4	3	1
M.A.	2	5	8
M.S.	18	27	26
M.P.H.	13	7	11
D.P.H.	14	17	12
Total	159	133	172

## Italian Mutual Benefit Funds in Elementary Schools

A RECENT Italian decree gives effect to a law passed in 1929, establishing mutual benefit funds in the elementary schools throughout the country. Membership in the funds is compulsory for teachers and optional for pupils. The funds are intended to pay for medical care in case of illness and also for preventive measures, such as periodic physical examinations, open-air schools, school clinics, ultra-violet ray treatments, rest homes, vacation colonies, and school lunches. The decree requires that the school children be given instruction in the rules of personal hygiene and the principles of social insurance.

The dues are to be 10 lire annually; in exceptional cases they may be re-

duced to 6 lire. The dues for poor children may be paid by child welfare agencies. Part of the amount paid by each pupil is transferred to the invalidity and old age insurance fund, membership in which is compulsory for nearly all wage earners in Italy, and is credited to the pupil when he reaches the age of 20 and becomes subject to the compulsory insurance. In the case of persons not subject to old age insurance the money is placed to their credit in a Government savings bank.

For the administration of the law there will be established a "National Office of School Mutual Funds," with provincial and municipal branches.—*Ministero dell' Educazion Nazionale, Bolletino Ufficiale*, Rome, No. 14, 1933.

# The Work of Walter Reed and His Associates of the Medical Department of the United States Army\*

MAJOR GENERAL ROBERT U. PATTERSON

*The Surgeon General, United States Army, Washington, D. C.*

YELLOW fever is a disease of great interest to medical officers, not only on account of its military importance, but because of the epochal work in its control that has been done by officers of the Medical Corps of our Army. That fine old military surgeon and signer of the Declaration of Independence, Benjamin Rush, a Physician General in our Revolutionary Army, wrote in 1793 an account of his work in fighting the epidemic of yellow fever in his native Philadelphia which even today is unapproached for its realism. The part that he played in this epidemic was an important one, and if he had never done anything else, would have earned him a place among pioneers in preventive medicine.

In 1820 Surgeon's Mate Merrill of the 8th U. S. Infantry, outlined a new treatment for the disease, which, while perhaps not in keeping with modern clinical methods, at least had the merit of giving great relief to the sufferers in comparison with the extensive venesection and massive doses of purgatives that had been used up to that time.

When Carlos J. Finlay of Cuba stated his theory of the insect transmission of yellow fever in 1881, a real step forward was made, and his chief,

that distinguished scientist, Surgeon General Sternberg, realizing the desirability of special training in methods of research, sent Major Walter Reed to Johns Hopkins to study pathology under Welch.

During his tour of duty in Baltimore Reed made an important contribution to the pathology of the liver in typhoid fever. In April, 1899, he showed that *B. icteroides* (Sanarelli) was really a variant of *B. cholerae* suis (hog cholera), and if found in yellow fever existed only as a secondary invader. Following the Spanish-American War, in which there were more than 20,000 cases of typhoid fever, though battle casualties numbered only 350, a board of officers was appointed to study the cause of the epidemics. The board consisted of Major Walter Reed, Major Victor C. Vaughan, and Major Edward O. Shakespeare. There is an army saying that boards are long, narrow, and wooden, but this one was not of that character, for its findings have been of inestimable value by contributing to our knowledge of means for the preservation of the public health.

As is well known, the board found that more than 90 per cent of the volunteer regiments developed the disease within 8 weeks after going to camp; that typhoid fever is disseminated by the transference of excreta of infected individuals to the alimentary tracts of

\* Delivered at the Special Memorial Session to Dr. Walter Reed and his Associates on the Yellow Fever Commission at the Sixty-second Annual Meeting of the American Public Health Association in Indianapolis, Ind., October 11, 1933.



others; that camp pollution was a more prominent causal agent in this instance than contaminated water supplies; that the disease was largely spread by flies and the hands of human carriers. Contrast for a moment the conditions which prevailed in the World War, when thanks to prophylaxis and improved sanitation, instead of the half million cases of typhoid fever which would have occurred had the rates of the Spanish-American War period prevailed, there were only 1,572 out of more than 4,000,000 men who served with the colors.

In 1900 Walter Reed was detailed as the head of what is probably the greatest of all army scientific boards. It was to pursue "scientific investigations of acute infectious disasters in the Island of Cuba," and "to give special attention to questions relating to the etiology and prevention of yellow fever." The latter disease was still thought by many to be caused by the so-called *Bacillus icteroides* of Sanarelli. Sternberg's selection of Reed for this important duty is an indication of his appreciation of his abilities. Sternberg's own great contribution to our knowledge of yellow fever was his refutation of the mistakes of other workers, and the indication that the causative microorganism was not to be found by ordinary bacteriological methods.

Reed went to Cuba in June, 1900, accompanied by his assistant, Major James Carroll. The other two members of the commission were already there, Assistant Surgeon Aristides Agramonte and Dr. Jesse W. Lazear, who had made special studies of the disease at Johns Hopkins and in Italy with Sanarelli.

An intimate friend of Reed's tells us that at the first meeting of the commission in August, 1900, four interlinking facts were considered. First, was Ronald Ross's announcement in July, 1898, of the discovery of the transmission of malaria by mosquitoes.

Second, there was the thorough cleaning which the American administration had given to the city of Havana, without in any way improving the yellow fever situation, thus apparently eliminating the question of its being a filth disease like typhoid fever. Third, there was the publication by Dr. Henry R. Carter of the U. S. Public Health Service in May, 1900, of his excellent epidemiological observations on the disease, observations which in the light of Ross's work pointed toward insect transmission. And finally there was the widely accepted belief in Havana that yellow fever was transmitted by the bite of a special mosquito. Dr. Carlos J. Finlay, a native of the West Indies, though born of Scottish and French parents, had for 20 years (*i.e.*, since 1881) argued upon epidemiological grounds that yellow fever was transmitted by the common household mosquito.

The first important contribution of the board was to demonstrate that the blood (during life) of 18 well marked cases of yellow fever (4 of them fatal) did not show the presence of the so-called *B. icteroides* of Sanarelli. Nor did cultures from the blood and viscera after death in these cases yield *B. icteroides* nor any growth or organism. In most instances nearly all cultures were negative. This finally disposed of *B. icteroides* as a causative factor in yellow fever.

At the very outset of their work Reed was called to the United States by the death of Major Shakespeare, and he had to rescue the records of the typhoid board. By the time he got back to Cuba a month later, Major Carroll and Private Dean of the Cavalry (known in the records as XY) were convalescent from experimental yellow fever, and Lazear was dead. Though not generally known, Lazear's case was also experimental.

These experimental cases occurred

just as the board was all but ready to reject Finlay's theory, for nine times they had failed to convey the disease by mosquito bites. The reason is now clear to us though then unsuspected by them. The disease was not so transmitted either because of failure to allow the mosquito to bite the ill person sufficiently early in the disease to acquire the infective agent, or a failure to keep the mosquito sufficiently long after it had ingested blood from a case, before permitting it to bite the experimental subject, so that the virus did not have the opportunity to undergo the necessary development within its body to become capable of transmitting the disease.

The experiments of the Reed commission are graphically described after the manner of a detective story by Professor Turner and Miss Hallock. In seeking the hidden criminal, the producer of the dreaded "Yellow Jack," the master detective and his assistants had presented to them six clues. The first clue was that most accounts of yellow fever mentioned the presence of mosquitoes in numbers. Thus the "suspect" was at the scene of the crime. The second clue was that the epidemics started in low wet regions or near the docks. As the mosquito breeds in water, here was another ground for suspicion. The third clue was that in high, dry parts of a city the disease was not contagious. Though people from the low-lying sections fled to the higher parts of a city, and might come down with yellow fever after arriving there, the disease did not spread to other people in the new neighborhood. Thus our detectives realized that the disease must be carried in some other way than directly from one person to another. Other detectives had realized this, but most of them jumped to the conclusion that this could only indicate that the disease must be present in the *air* of certain districts and not others. The

fourth clue seemed to strengthen the idea that the disease was air-borne. It had been noticed that it spread in the direction of the prevailing wind. As the mosquito is a great lover of home, it never travels far except when carried along by the wind, or a ship. The fifth clue lay in the observation that yellow fever flourished in hot weather, but disappeared with frost. Until our sleuths suspected the mosquito, this clue was lost on the detectives because they concluded merely that heat was a common exciting cause of the disorder. The sixth clue, one which was not discovered without careful study, was that for 15 days after a patient had come down with yellow fever his house was not infected, for people could come and go without getting the disease. But after 15 days any non-immune who would go there would take the disease in from 1 to 6 days. Reed suspected that the deadly microorganisms of yellow fever were, during this 15-day period, hidden away within the body of the villain of the play, the mosquito. This villain had a bad reputation, and had long been suspected, but it was not easy to prove the suspicion to be true.

In every well ordered detective story it is necessary not only to prove the villain guilty, but the other suspects must be proved to be innocent. In 1900 it was accepted by almost everyone that yellow fever was carried by *fomites*, that is, excretions of yellow fever patients on clothing, bedding, etc. Much valuable property was destroyed in this belief. Volunteers, under Reed's directions, slept in a poorly ventilated room, specially constructed and heated to 90° to simulate the conditions in the hold of a vessel in the tropics, making their beds with piles of sheets, pillow-slips, blankets, etc., which had been contaminated by yellow fever patients. For 20 nights three non-immune volunteers slept in this room, but none of them developed yellow fever. The ex-

periment was repeated later on two occasions, some individuals actually sleeping in the soiled nightclothes of yellow fever patients, without these volunteers contracting the disease. The fomites had been cleared of suspicion of the crime. Seven individuals in three groups submitted themselves to this experiment, which was loathsome both to sight and smell, to say nothing of their belief that they might contract the disease.

Thus we have the background and preliminary experiments of Reed and his coworkers. Animals not being susceptible, human beings must be used. The three volunteers, Carroll, Dean, and Lazear submitted to the experiment, and all came down with yellow fever, as has been said.

Further human experiment was indicated, but to do this, even though men volunteered, required the approval of higher authority. Fortunately at that time the Governor of Cuba was a great man who held at the same time two commissions. He was a major general of volunteers, and he was a captain of the Medical Corps of the Regular Army, therefore with a knowledge and appreciation of the importance of the experiments proposed. So to Leonard Wood went Walter Reed to receive his approval and promise of moral and pecuniary support. The approval of the Surgeon General was also necessary; so Reed again went to the United States.

Curiously enough, and it is of particular interest to us at this time, another commission had been working for over a year in Cuba and had decided that Sanarelli's *Bacillus icteroides* was the cause of the disease. The French Academy of Medicine had already accepted Sanarelli's organism, and the other commission sought to make its report to the American Public Health Association at its meeting right here in Indianapolis. Had the American Public Health Association likewise gone on

record as believing the *Bacillus icteroides* to be the cause of yellow fever, Reed would have indeed had a hard time to continue his investigations in Cuba. So he went post-haste to Indianapolis, and in a fiery debate routed the advocates of Sanarelli's bacillus.

In 3 weeks Reed was back in Cuba and, with funds provided by General Wood, constructed Camp Lazear, 6 miles from Havana and at a distance from all known sources of infections. Agramonte bred and infected the mosquitoes for the Commission, and all was ready except the men who should face the dreaded experiment. Two young Americans came forward and volunteered. They knew well the risk that they ran, but they also knew the vast importance to humanity of the question at issue. Their names are: John J. Moran, Field Clerk at Headquarters, and Private John R. Kissinger, Hospital Corps. Moran was first to be bitten, but Kissinger was first to be taken ill. Their act was brave and noble, and they did it without heroics or desire of reward. Later with the American volunteers were certain Spaniards who endured the test for a reward of gold and the promise of immunity from further attacks. The financial reward, however, was not sufficient to discount the courage of each American and Spaniard who received a monetary honorarium.

The brave conduct of the volunteers was recognized at the time by men of science, though the general public knew little about it. Their deed was such as to merit the award of the Medal of Honor, our highest military decoration, given only for bravery in the face of the enemy "above and beyond the call of duty." Certainly their acts measure up to this high standard, for the enemy that they faced was far more deadly than any visible enemy armed with rifle or other man made weapon.

The Secretary of War, Mr. Root, in his report of 1902, urged that this work receive merited recognition. He said:

The brilliant character of this scientific achievement, its inestimable value to mankind, the saving of thousands of lives, and the deliverance of the Atlantic seacoast from constant apprehension, demand special recognition from the Government of the United States.

But nearly 30 years rolled around before proper recognition was accorded them. By the Act of February 28, 1929, Congress directed that a Roll of Honor appear annually in the Army Register, and on this roll the names of these brave men should appear. A gold medal was also to be presented to each, or to the representatives of those who had died. It may not be amiss to cite you these honored names:

#### MEMBERS OF THE BOARD

Major Walter Reed, born in Virginia  
Major James Carroll, born in England  
Dr. Jesse W. Lazear, born in Maryland  
Dr. Aristides Agramonte, born in Cuba

#### INOCULATED WITH YELLOW FEVER

In alphabetical order:

Private John H. Andrus, born in Pennsylvania

Mr. John R. Bullard, born in Massachusetts

Private A. W. Covington, born in North Carolina

Private William H. Dean, born in Ohio

Private Wallace Forbes, born in Illinois

Private Levi E. Folk, born in South Carolina

Private P. Hamann, born in Germany

Private James F. Hanberry, born in South Carolina

Private Warren G. Jernegan, born in Florida

Private John R. Kissinger, born in Ohio

Mr. John J. Moran, born in Ohio

Private William Olson, born in Wisconsin

Private Charles G. Sonntag, born in South Carolina

Private Clyde L. West, born in Georgia

Folk, Jernegan, and Hanberry of this group had previously undergone the experiment of sleeping with fomites in the house I have already described before they submitted to inoculation by the bite of infected mosquitoes.

#### SLEPT IN INFECTED BEDDING

Dr. R. P. Cooke, A.A. Surgeon, born in Virginia

Private Thomas M. England, born in Ohio

Private James Hildebrand, born in Georgia

Private Edward Weatherwalks, born in New Jersey

Of Reed, General Wood said:

I know of no other man of this side of the world who has done so much for humanity as Dr. Reed. His discovery results in the saving of more lives annually than were lost in the Cuban War, and saves the commercial interests of the world a greater financial loss each year than the cost of the Cuban War. . . . Future generations will appreciate fully the value of Dr. Reed's services.

And President Eliot, of Harvard, in admitting Reed to an honorary degree, expressed himself in somewhat the same terms.

The task of eradicating yellow fever from Havana fell to Major William Crawford Gorgas, later Surgeon General of the Army. Gorgas was appointed chief sanitary officer of Havana on February 10, 1900. Under General Wood's orders he instituted the measures now practised everywhere in combating mosquito-borne diseases. He screened yellow fever patients, destroyed mosquitoes, etc., and in 3 months Havana was freed from the disease for the first time in 150 years.

The success of Gorgas in Havana led naturally to his being put in charge of similar work in the newly acquired Canal Zone in 1904. Here what had been a notorious plague spot of disease, the "White Man's Grave," as it was called, was converted into one of the healthiest communities in existence. Gorgas continued the methods which had proved so successful in Havana. In the face of much stupid opposition at first, Gorgas never hesitated in attaining his objective, that of making the isthmus free from yellow fever, and with other diseases under control, before the operations on the canal were commenced. While the elimination of

other diseases was no less important than that of yellow fever, this malady comes first in the minds of the general public. Under the French occupation it was a byword that every tie laid on the Panama Railway cost a life. From 1881 to 1889 the French lost more than 22,000 laborers by death, an annual rate of 240 per 1,000. One station on the old Panama Railway was called "Matachin," from the Spanish words *matar* (kill) and *Chino* (Chinaman), because 1,000 imported Chinese coolies at this point died off in 6 months, as did also 1,000 from the West Coast of Africa.

When the United States took charge of Panama the death rate was 40 per 1,000. A yellow fever epidemic raged from July, 1904, to December, 1905. In less than a year Gorgas had eradicated it entirely, and there has not been a single case of the disease there since May, 1906.

In one of his reports Gorgas said:

When the Canal shall have been finished it can be shown that sanitation cost about \$365,000 per year. For a population of 150,000, this means an expenditure of about 1 cent per capita per day, and this sum is well within the means of any tropical country.

Elsewhere he says:

I do not believe that posterity will consider the commercial and physical success of the Canal the greatest good it has conferred upon mankind. I hope that as time passes our descendants will see that the greatest good the Canal has brought has been the opportunity it gave for demonstration that the white man could live and work in the tropics, and maintain his health at as high a point as he can, doing the same work, in the temperate zone. That this has been demonstrated none can gainsay.

In 1906 during the period of our second intervention in Cuba, Major (now Brigadier General, retired) Jefferson R. Kean, a medical officer who had already been commended for his work in helping the Reed Yellow Fever Board, and curiously enough the first yellow

fever patient that his friend Reed had ever seen, was placed on duty by President Taft as Sanitary Adviser to the Provisional Government of Cuba. This position he held throughout the entire period of occupation (1906-1909), and during this time he extinguished yellow fever, which had reinvaded the island during the first Cuban republic, no doubt partly owing to the great increase in the non-immune population, and it had spread all over the island. In 1900, when yellow fever had been extinguished in Havana, it disappeared from the entire island.

During the remainder of his life, even while he was Surgeon General of the Army, Gorgas was frequently called to distant parts of the tropical world to give advice and assistance. After his retirement from active duty, after having served as Surgeon General through the World War, he was on his way to South Africa on work for the International Health Board, when, delayed in Europe by the award of many honors, he died suddenly in London, having been knighted on his deathbed by King George V. As Colonel Ashburn said, "He was a varray parfit gentil knyght."

The preventive measures used by Reed and Gorgas have been, and are being put into effect in many tropical lands. In his recently published report on *Twenty-five Years of American Medical Activity in the Isthmus of Panama*, a work received with enthusiasm in Britain, France, and elsewhere, Colonel Weston P. Chamberlain, Health Officer of the canal, says:

By far the larger part of the morbidity and mortality formerly attributed to tropical climates was due, not to climate *per se*, but to isolation, nostalgia, venereal disease, alcoholic excess, poor municipal conditions, and, most important of all, to infection with specific parasites whose invasion is now entirely preventable. . . .

Commenting on which, Sir William Horrocks remarks: "This may justly

be regarded as a triumph of preventive medicine."

It is a great pleasure to me to know that 4 of these brave men who submitted their bodies to the bite of infected yellow fever mosquitoes (*Aedes Egypti*), or to inoculation directly with the blood of yellow fever patients in these conclusive experiments of Reed and his coworkers, are living and present at this banquet this evening. It will be an honor to meet them face to face, and be able to greet them. It was my great privilege as a junior officer of the Medical Corps of the Army to be a member of the class which graduated from the Army Medical School in 1902. This was the last class to complete the entire course under the direct teaching of this great benefactor of humanity, Walter Reed. He died, as you know, November 23, 1902, shortly after the opening of the session 1902-1903 of the Army Medical School. He was a born teacher. His command of clear and concise language, and his ability to impart his knowledge to others I have never seen excelled, if equalled. How happy we students were to be able to call him friend. While he was a member of the Medical Corps of the Army, on which he shed such undying luster, by his accomplishments he belongs, as we in the Medical Corps of the Army are always proud to feel and never forget, to the whole American medical profession. The inspiration of his work and those who labored with him will remain with us forever!

In closing, I have some personal recollections connected with the eradication of yellow fever from the island of Cuba during the second occupation. In the years following Reed's and his coworkers' discovery and its practical application by Gorgas, the first Cuban Republic had been established. As you know, yellow fever again was reintroduced into Cuba. You will recall that at the time of the second intervention

one of the problems which the provisional government had to face and solve was the presence of yellow fever in the island. It was my good fortune to serve during the second intervention, 1906 to 1909, as a member of the Army of Cuban Pacification. Through the courtesy of General Kean, then a major, and as previously stated the sanitary adviser for the provisional government, I met Dr. Carlos J. Finlay, Dr. Juan Guiteras, and Dr. Aristides Agramonte, who were known as the Yellow Fever Board. One of their duties was to see all cases of yellow fever occurring in Havana and to make a final diagnosis in any case of doubt. Owing to the kindness of the members of the board I had an opportunity to see practically all cases of yellow fever in the Beneficentia and the Las Animas Hospitals in Havana until the disease was controlled. I was intensely interested in having this opportunity to see closely this interesting disease. It is a matter of great satisfaction to me to recall that I had this opportunity and the privilege of knowing these three distinguished men, particularly Dr. Finlay who, though he did not prove his theory, was the one who was always convinced that the mosquito was the vector. A few months ago at a dinner given in a private home in Washington, I had the pleasure of meeting the son of Dr. Finlay, who is also a doctor and a specialist in ophthalmology. At the time he had literally just "escaped" from Cuba as he told me. On account of his interest in the students and his connection with the University of Havana, he had been seized by the Machado government last spring and put in prison for a period of some months without any charges being preferred, or being given a chance to face his accusers. Some time after he was released he had excellent reasons to think that his life was in imminent danger. He was forced to come to the

United States. It was interesting to meet the son of a great man who also has inherited from his father much personal charm and professional ability.

I trust that our good friends in the Island of Cuba will soon be able to adjust their difficulties and restore once more in that beautiful country a stable

government which will insure the prosperity and happiness of all their people.

I hope that the American Public Health Association on this occasion will send a special message to the faithful wife of Walter Reed who was his companion during his years of service, and who still survives him.

## A Symbol



THE Yule log—symbol of Christmas through the ages. On the great holiday the lord of the manor threw wide the doors, and misery and squalor were forgotten in the cheer of the boar's head and wassail.

Customs change, but the Christmas spirit is ageless. Today millions express it by the purchase of Christmas Seals—the penny stickers that fight

tuberculosis—still the greatest public health problem. Your pennies will help pay for free clinics, nursing service, preventoria, tuberculin testing, X-rays, rehabilitation and other important work such as medical and social research. *Buy Christmas Seals.*—The National, State and Local Tuberculosis Associations of the United States.

# The Story of the Epidemic of Encephalitis in St. Louis\*

JOSEPH F. BREDECK, D.P.H.  
*Health Commissioner, St. Louis, Mo.*

THE story of the epidemic of encephalitis in St. Louis and its vicinity is a very interesting one. Climatic conditions in the area involved were unusual for the three summer months—June, July and August. According to the official Weather Bureau records, the rainfall in St. Louis County for these months was the lowest since 1837, when the first official records began. For the City of St. Louis, the rainfall was the lowest in its history, except for a very small portion of the city which, during a single cloudburst, put the official record somewhat higher. The drainage and sewage problem in St. Louis County was favorable to the breeding of unusually large numbers of mosquitoes in areas commonly infested. In addition, the odors emanating from these open sewage channels were pronounced throughout the unusually dry summer season. In passing, it is of interest to know that there was an epidemic of rabies in St. Louis which began in March of this year.

The first information concerning the epidemic of encephalitis reached the Health Division of St. Louis August 8, 1933, when the superintendent of the Isolation Hospital notified the Health Division that 16 cases of an unusual type of encephalitis were admitted from the St. Louis County Hospital. On

August 9 these cases were examined by a member of the Health Division together with staff members of the Isolation Hospital. The histories, physical examination, and other facts obtained were discussed by the members of the Health Division, and immediate steps were taken to advise the medical profession and the laity of the epidemic. It was important that such knowledge reach the public as well as the medical profession, and the newspapers of St. Louis were very coöperative in promulgating all necessary information.

On August 10 still more cases came in from the County, and it was quite obvious then that the City of St. Louis could not escape the epidemic. Plans for field investigation were formulated and started on the same day, on the County cases, since there were then no cases reported in the City of St. Louis proper.

On August 12 a telegram was received from the Surgeon-General of the U. S. Public Health Service offering us all assistance we might need, and we wired back requesting an epidemiologist. Dr. James P. Leake, Senior Surgeon, U. S. Public Health Service arrived on the morning of August 14. Up to this date we still had no cases reported in St. Louis, so that all of our investigations were concentrated out in the County.

On August 12 it was felt that if we were to get anywhere in the study of this epidemic, we must have the co-

\* Presented at a Special Session of the American Public Health Association on Epidemic Encephalitis (under the auspices of the Health Officers Section) at the Sixty-second Annual Meeting in Indianapolis, Ind., on October 10, 1933.



operation of all the health officers in St. Louis and surrounding territory. Letters were sent out to all of these officers inviting them to a meeting in the Health Commissioner's office in St. Louis on August 14. At this meeting a uniform questionnaire was proposed and general plans for handling the epidemic were discussed. On August 17, the Metropolitan Health Council was formed, composed of all health officers in St. Louis County, St. Louis proper and those on the East side, in St. Clair and Madison Counties, in Illinois. The Metropolitan Health Council was to be a coöperative body, to meet at call of the secretary for the handling of emergencies and the exchange of ideas on public health matters. Rules and regulations for handling the cases of epidemic encephalitis were suggested and adopted.

Early field investigations led us to believe that we were dealing with a disease which was similar in its spread to poliomyelitis. The cases were widely scattered, occurring in the suburban areas of the County. It was apparent very early that rarely more than one member of a family was affected, and that the upper age groups were involved more than younger individuals.

It was important also to decide on the hospital program to be inaugurated. The Isolation Hospital it was evident would not be able to handle all the cases, so that the throwing open of all the hospitals in St. Louis for the care of these patients was an urgent matter. As the field investigations were so strongly in favor of the disease not being readily communicable from one member of the family to another, we felt it would be safe to handle these cases in the general hospitals provided sections of the hospitals were set aside for their care and where the routine isolation could be enforced as with any other communicable disease. This was done by sending a notice to all super-

intendents of hospitals and had their complete and immediate coöperation.

It became manifest early that the diagnosis was delayed for several days in many patients who had nothing more than fever. The early cases also showed the importance of lumbar puncture as a diagnostic procedure. Since it was of the utmost importance to stress lumbar puncture, we deemed that the hospital was the only satisfactory place where this could be done with the minimum amount of risk. While it is true that in some homes lumbar punctures could have been done, in most instances it was not satisfactory. Besides, the clinical symptoms and complications that arose made it almost impossible to care for these patients in the average home without a day and night nurse. Bladder symptoms requiring catheterization, and patients with delirium often requiring restraint would be handicapped by home treatment. Therefore, hospitalization of all cases was urged, and over 95 per cent of the cases throughout the epidemic were handled in hospitals. Hospitalization further gave an opportunity for more accurate clinical studies and laboratory studies than could have been made at home.

Now that the epidemic is practically over the wisdom of such a procedure is more apparent than ever. Today we can gather uniform clinical and laboratory data from the hospitals so that a complete study and analysis of the epidemic can be made with less amount of error and with more satisfactory types of record.

It was important early to draw attention to the fact that all fever cases where there were no obvious signs of any disease should have a lumbar puncture. In this way we emphasized the importance of early diagnosis and the isolation of doubtful fever cases until such a time that an accurate diagnosis could be established.

Through the newspapers and members of the medical profession we were able to create a public sentiment and coöperation that was amazing. The information issued early was complete from the clinical angle so that little difficulty could be experienced in recognizing the importance of fever, headache, and other symptoms so prominent in this disease. The response was almost dramatic. The cases came in from all sources for consultations to the Health Division, and hospitalization was made routine. Hospitalization served a double purpose of establishing the diagnosis more promptly and at the same time isolating the patient. It was urged that this isolation should be maintained for at least 3 weeks from the date of onset of the disease. All the bulletins that were issued called attention to the clinical symptoms and necessity for isolation.

The reports started coming in to the City of St. Louis on August 17. Then a very curious phenomenon occurred when we started to date back the onset of the first case. Medical men commenced to think back and there was a certain amount of friendly rivalry among the profession as to having had the distinction of recognizing the first case. This led to the discovery that cases that had recovered for several weeks were not reported. When we analyzed the cases we found that the first cases in St. Louis proper were on July 30. The first case in the County was July 7.

With the importance of fever of unknown origin, a number of curious circumstances arose in which we discovered that a large number of bloods had been sent to the City Health Laboratory for Widal test for typhoid. The number of such bloods sent in was over 100 per cent higher than the year previous and this occurred during the month of July and continued throughout August. All of these bloods were

negative for typhoid. A complete analysis of these cases is not yet available, but there are suspicions that some of these were probably encephalitis cases of mild character.

With a uniform history blank for the County as well as the City a central clearing-house through the Metropolitan Health Council was established. Daily reports of cases were sent in to the secretary who had them tabulated, and mimeographed copies made and sent out to all health officers of the Council. In this way they kept in touch with the progress of the epidemic. All rules and regulations were based on the strong belief, after field investigations, that we were dealing with a virus disease transmitted through the nasal secretions. Such impressions were reached early because of the very close similarity of spread, and of the seasonal occurrence as in poliomyelitis.

In the County in the first place water was excluded because there were two separate water supplies in St. Louis County, both of which areas were equally involved in the epidemic. The milk supply of St. Louis County is largely supplied from the same dairies as those supplying the City of St. Louis. Home investigations showed no common sources of food in any of the families, so that water, milk and food were excluded early.

Before the first week elapsed numerous theories came pouring into the Health Division office and we had a revival of many of the ancient theories concerned with past epidemics. The miasmatic theory was revived in so far as many felt that the odors from sewers and open drainage channels were responsible for the epidemic. Because the term "sleeping sickness" had been applied, it was thought by less well informed people to have been transmitted by flies. By a strange coincidence a missionary and his family had visited St. Louis County who had just

returned from Africa and within 30 days the epidemic of encephalitis started. The purchase of certain foreign species of animals for the Zoo were also thought to have brought the disease to the City. These, of course, were dismissed without any serious consideration and are mentioned because they are but a few of the many fanciful suggestions that a health officer receives.

Then, as the cases came in with no contact history, the carrier mode of spread became quite important. With the large number of mosquitoes in the areas involved naturally this theory became quite prominent in the minds of many "well-informed" people. However, it never appealed very strongly to the Health Division that mosquitoes played an important rôle in the spread of the disease. With the infection so widely spread and the prevalence of mosquitoes so obvious, they had to be investigated thoroughly. As the result, the Public Health Service men together with the man from the Army Medical School carried on this work to attempt to solve the problem. Up to this time there has been no evidence accumulated to show that mosquitoes have any part to play in the transmission of this disease. While these experiments have not yet been completed, we naturally hold an open mind as to the results.

It was important early to centralize all the laboratory work, particularly from the research angle. All of the pathological material had to be gathered together for animal inoculations since the spinal punctures and brain cultures were negative. With negative cultures by competent laboratory investigators in several hospitals, it was felt that we were on the way to establishing it as a virus disease.

Various animals were selected for the inoculations of brain tissue and other body fluids. Before the susceptible animal was found one of the laboratory

investigators found inclusion bodies in the kidney which lent further support to the virus theory of disease. Following closely upon this, monkeys that had been inoculated with brain substance from autopsy material, developed fever and clinical symptoms of encephalitis as seen in man. The microscopic pictures were not unlike those found in human cases. This was very encouraging indeed, and up to this time the monkey inoculations have progressed and the virus has been carried on through three or four series of monkeys. It is the hope and ambition of those engaged in this research that the virus will be maintained and adapted to this species of monkey so that further valuable data may be accumulated. The difficulties of adapting the virus are many. It is too early to state at this time whether such adaptability will be complete or not.

Even the laboratory workers had many suggestions offered them as to how they should proceed. But we have been very fortunate in St. Louis in having two great medical schools who have so admirably coöperated in this research work. Washington University was selected to carry on the particular animal inoculations together with the Public Health Service men, because they had suitable animals, laboratories, and a personnel particularly interested in virus diseases. It was the most expedient place to carry on the work without any loss of time, and a place in which the Service men might establish their headquarters for field as well as laboratory investigations.

Centralization of authority in the Metropolitan Health Council for handling the entire epidemic was a very important step. The personnel of both universities, the hospitals, and the health officers have coöperated to the fullest extent. Their example of unity of purpose might well be emulated elsewhere. With conflicting views and sug-

gestions coming in from all directions the Metropolitan Health Council has stood firmly on the principles that no regulations should be made without careful consideration of the facts obtained. Theories have their place when based on facts. The best professional minds were mobilized locally with the coöperation of the State Health Department and the Public Health Service. No words of mine could express the gratitude, particularly toward the Public Health Service, that is felt by the local authorities in St. Louis and surrounding areas. Their steadying influence has served to concentrate effort and regulations.

As time went on, the opening of the schools became a problem in the minds of many and the St. Louis Health Division, and the Metropolitan Health Council took a very definite stand that the schools should be opened without any restrictions. Health officers are very often tempted by public sentiment and even by professional men to close schools when anything unusual happens. There was no real basis whatsoever for the closing of the schools. The Health Division of St. Louis felt very strongly that this was a time for education of the public and took the stand that schools should open. Public opinion should be created and not merely accepted. There were many who doubted the wisdom of this recommendation, but almost simultaneous with the opening of the schools the epidemic reached its peak and has continued to subside ever since. Others felt that because of the dryness of the season and the odors emanating from many sewers that the Fire Department should be called out to flush sewers. Another miasmatic revival. No water was wasted and the epidemic subsided.

Most of the aggravation we had to contend with came from without the City where newspapers not in contact with the local situation tremendously

exaggerated the picture. People were afraid to come to St. Louis to transact even urgent business. Parents were afraid to send their children back to schools and colleges. Yet they had been advised by local, state and federal authorities that business matters could be carried on as usual in St. Louis. Up to this date we have had no reports come to us that lead us to believe that the epidemic was spread elsewhere by any persons going through St. Louis.

During the course of the epidemic, the Metropolitan Health Council appreciated the necessity of making official reports of the research investigations and these were to be made in writing by the Research Committee so appointed and given out by the Council alone. Up to this time the Committee has reported only facts as they have come forth with animal inoculations. As the epidemic progressed the Metropolitan Health Council further has appointed a committee for follow-up work every 3 months for the next year and every 6 months for the second year. The purpose of this was to determine the nature and severity of the after-effects that may have resulted from this disease. Another committee has been appointed for publication so that authoritative facts may be forthcoming from this epidemic. In this way we hope to contribute something of value to others who may be confronted with this same problem in the future.

The Metropolitan Health Council has felt deep responsibility locally as well as nationally in the handling of this epidemic. We have been fortunate, indeed, in having the splendid assistance of the U. S. Public Health Service and others outside of St. Louis in attempting to solve some of the difficult problems involved. We have tried to demonstrate modern public health methods in handling this epidemic while conflicting opinions arose. One of the most important precepts govern-

ing the regulations that were issued was to emphasize first principles of handling any communicable disease: "early diagnosis, hospitalization, and isolation of all fever cases until an accurate diagnosis could be established." The practical handling of the problem could not wait for laboratory confirmation. Many questions arose that might involve months or even years to solve. The soundest principles that we felt were justified were in the belief that this was a virus disease and spread by human carriers and mild cases. Because of the rarity with which more than one member of a family was involved, it was not even deemed advisable to quarantine members of the family. The Health Division did not want to impress anyone with the idea that it was doing more than it was possible to do.

The public was thoroughly informed daily as to the actual facts in the epidemic, and the reasons why certain precautions were taken and why many

other procedures were not advocated.

That the measures of early diagnosis, hospitalization and isolation were efficient can be measured only by the fact that 95 per cent of the reported cases were hospitalized. How successful in checking the disease this was, is a matter of speculation. There is no actual method that we can apply in determining the efficiency of such measures. They are, however, those that have been recognized in the handling of all communicable diseases. Our greatest consolation was in the fact that we did not issue regulations which were not based on sound public health practice. Until more fundamental knowledge is forthcoming concerning the true etiology, mode of spread, or specific remedies for this disease nothing could be advocated further.

The epidemic has now disappeared to the point where there are only a few sporadic cases. We have witnessed to date an epidemic of 1,065 cases with 197 deaths.

## Epidemiology of Encephalitis\*

### With Special Reference to the 1933 Epidemic

JAMES P. LEAKE, M.D.

*Senior Surgeon, U. S. Public Health Service, Washington, D. C.*

THE identity or non-identity of the encephalitis prevalent during August and September of this year in St. Louis and elsewhere, with ordinary lethargic or epidemic encephalitis, is an open question.

Assuming for the present that they are two different diseases, it may be

useful to compare them epidemiologically with poliomyelitis. In spite of the similarity of the St. Louis disease to poliomyelitis as to seasonal epidemic occurrence and minute histological changes (apart from the preponderant selective localization of poliomyelitic lesions in the anterior gray matter of the spinal medulla), they cannot be considered as due to the same virus. Though showing a limited amount of variation from epidemic to epidemic,

\* Presented at a Special Session of the American Public Health Association on Epidemic Encephalitis (under the auspices of the Health Officers Section) at the Sixty-second Annual Meeting in Indianapolis, Ind., on October 10, 1933.

poliomyelitis as a disease is not subject to such a wide variation as would be necessary to cause an entire epidemic like the recent one. Poliomyelitis has not been so difficult to transfer to animals as has the recent disease. In a limited personal survey—the result of the present investigation will of course not be available for months—two children were found to have had poliomyelitis a few years before the attack of encephalitis, and similar cases have been mentioned this year in Kansas City and Cincinnati. Two attacks of poliomyelitis in the same person are much more uncommon than this.

Except for the higher mortality in Japan, which is always an uncertain difference, the St. Louis outbreak appears to be a counterpart of the Japanese disease which was epidemic recently in 1924 and 1929. The Japanese have differentiated this as Type B encephalitis, and it may be convenient to preserve this distinction, calling the ordinary form, described by Economo, Type A encephalitis, until immunity tests or other study justify a combination or further separation.

The course of the epidemic is shown in Table I, in cases reported by weeks for St. Louis County and St. Louis City, two mutually exclusive administrative units.

The city is  $3\frac{1}{2}$  times more populous

TABLE I

REPORTED CASES OF ENCEPHALITIS BY WEEKS  
IN ST. LOUIS COUNTY AND ST. LOUIS CITY

Week ending	St. Louis County	St. Louis City
August 12	41	4
August 19	58	15
August 26	82	39
September 2	106	103
September 9	86	106
September 16	76	108
September 23	32	65
September 30	20	49
October 7	14	31
October 14	7	13
	<hr/> 522	<hr/> 533

than the county, having 840,000 people to the county's 230,000. It is evident that the epidemic began in the county, and was more intense there, the rate of cases per 100,000 being 230 for the county and 63 for the city, or 99 cases per 100,000 population for the city and county combined.

This sharply defined seasonal distribution is the same as that occurring in Japan, and is similar to that of the large epidemics of poliomyelitis, but is totally different from that of Type A encephalitis, which occurs at all seasons, but always has had its periods of highest incidence in winter and early spring. Compared with the St. Louis rate of 99 per 100,000, the rate in Kagawa province, the most severely affected in Japan, was 270 in 1924 and 51 in 1929. The area of Kagawa province is  $1\frac{1}{3}$  that of St. Louis City and County and the population is  $\frac{2}{3}$  as great. This is the 6th densest of the 47 provinces of Japan.

Multiple cases in the same family, and connected cases, have occurred in the St. Louis area in about the same proportion as with Type A encephalitis, and somewhat less frequently than in a poliomyelitis epidemic of similar intensity and population density. It might be expected that in an epidemic preponderantly of older people there would be fewer multiple cases in the same family than in epidemics chiefly affecting the young.

The relative frequency of mild or abortive cases is uncertain. Histories of possible cases of this sort have been obtained, but their identity with this disease remains inconclusive in many instances. It is believed that more mild cases have been reported and counted in the total in the St. Louis epidemic than is usual in epidemics of encephalitis.

Data regarding the incubation period are important. Considering only cases where absence from or entrance into the epidemic area occurred just prior

to onset, 7 cases indicated that the infection took place at least 4, 7, 8, 9, 11, 13, and 14 days, respectively, before the first symptoms, while 6 cases indicated that the infection took place not more than 9, 12, 14, 14, 14, and 21 days, respectively, before the first symptoms of the disease in the case becoming infected. The extreme possibilities for the incubation period in these cases would therefore be 4 and 21 days, and the necessary variation in this small group is great enough to take in incubation periods of 9 and 14 days.

No racial or sexual predilection has been shown, except a preponderance of males in the younger age groups, which is common to most diseases. There is no greater frequency in males than in females in the early adult years, such as is usual in smallpox.

As to age, the age group under 15 years comprises 23 per cent of the population in the St. Louis area, and had 13 per cent of the cases; the group 15 to 34 years old had 36 per cent of the population and 23 per cent of the cases; the group 35 to 54 had 28 per cent of the population and 29 per cent of the cases; the group 55 and over had 13 per cent of the population and 35 per cent of the cases.

An even greater preponderance in the aged characterized the two Japanese epidemics which covered the same area most intensively in 1924 and 1929, 5 years apart. A somewhat similar area was covered by the Japanese epidemics of 1912 and 1919, with a similar tendency as to age.

About 20 per cent of the cases reported in the St. Louis area have been fatal, slightly less in the county. This is in contrast to 50 per cent to 60 per cent fatality in the Japanese epidemics. It may be noted, however, that in Japan the ratio of the cases reported in the aged, to the population concerned, in percentages of the totals, is about twice that in the St. Louis area. In other

words, it seems possible that in Japan only the more serious cases tend to be reported, for both here and there the disease is much more severe and more fatal in the older age groups. A similar tendency with regard to smallpox has at times been noted in Japan, where a fatality rate of 80 per cent has been reported—much higher than is recorded elsewhere for large epidemics.

The age distribution of cases is of course very different from that observed in poliomyelitis, where the preponderance is much more marked in the opposite direction, the incidence being highest at about 5 years in metropolitan centers. The age distribution in Type A encephalitis varies with the reporter. There is no such uniform preponderance as in poliomyelitis, but usually during epidemics cases have been more frequent during the later childhood and early adult years, to about the same or to a greater extent than is true for the older age groups in Type B encephalitis.

Among the St. Louis cases, the milk supply was so various as to exclude that as a major factor in spreading the disease. The water supplies of St. Louis County and St. Louis City are entirely different. The early appearance of the epidemic in the county practically to the exclusion of the city, at once directed attention to the water, but within the county the municipality of Kirkwood has a supply drawn from the Meramec River, while St. Louis County and St. Louis City draw from the Missouri and the Mississippi Rivers above the Meramec. The Kirkwood cases were investigated and found to have used Meramec River water, and the incidence of the disease in Kirkwood was even slightly higher than in the remainder of the county.

No distinction as to economic status or occupation apparently separated the persons attacked by the disease from the remainder of the population.

The location of the cases is interest-

ing. There were 522 cases in the county, and 533 cases in the city, giving a rate per 100,000 of 230 for the county and 63 for the city. If the 28 city wards be divided into 6 groups, the eastern group, wards 2-11, bordering the Mississippi River but not the county, have an incidence rate per 100,000 of 31. The south mid-city wards, 13-16, have a rate of 46; the north mid-city wards, 18-22, 51; the two extreme northern and southern wards, 1 and 12, bordering both river and county, have a rate of 67, and the central mid-city wards, 17, 23, 25, and 26, a rate of 72. The three western wards 24, 27, and 28, bordering the county and not the river, with a population about the same as that of the other groups, have a rate of 142. Of the incorporated places in the county, the rate in University City was 200, in Clayton 177, in Richmond Heights 186, in Maplewood 236, in Webster Groves 158, in Kirkwood 284, in Glendale 480, and in Brentwood 530 per 100,000 population. Compared with these rates, Kagawa, the most thickly settled and the most heavily attacked province in Japan in both 1924 and 1929, had a rate of 270 in the former year and 51 in the latter. There are 1,000 people per square mile in Kagawa Province and 2,000 in St. Louis City and County.

This heavy incidence around, rather than in the middle of, the most densely populated area, is characteristic of the

disease this summer in Kansas City, and in other cities. It is striking, but is no different in order of magnitude, from that found in poliomyelitis. The rate in the New York City epidemic of 1916 was nearly tripled in the less thickly settled boroughs of Richmond and Queens as compared with the more metropolitan boroughs of Manhattan and the Bronx.

It is probable that even if Type B encephalitis is a different disease from Type A, it is not entirely new to this part of the country. Dr. H. D. McIntyre reported similar cases in Cincinnati in 1932 and the Illinois State Department of Health reported an outbreak of about 27 cases in Paris, a city of 9,000, in the same summer.

Cases in epidemic intensity have occurred this year in the Kansas City area, in St. Joseph, Mo., and in Louisville, Ky., but with less intensity than in the St. Louis area. In general, the prevalence has been below the 40th parallel of latitude. This geographical distribution, together with the seasonal incidence, suggests an insect carrier, and experiments are under way to test this hypothesis, but there is a similar tendency in poliomyelitis for certain latitudes to be more severely affected, and the early spread of the cases throughout the wide extended suburban area, instead of by radiation from a focus, is more characteristic of human than of insect transmission.



# Types of Epidemic Encephalitis\*

## A Comparison of the Cases Seen in St. Louis in 1933 With Those Seen in New York City

JOSEPHINE B. NEAL, M.D.

*Executive Secretary, Matheson Commission. In Charge of the Division of Infections of the Central Nervous System of the Health Department, New York, N. Y.*

PHYSICIANS practising during the past two decades have had the rare opportunity of observing the reappearance and development of epidemic encephalitis. Undoubtedly this disease has occurred in epidemic form under a variety of names during the centuries, and scattered cases have been diagnosed in retrospect in the years immediately preceding the present outbreak.

So far as we can learn the first cases of this epidemic occurred in the spring of 1915 in Bucarest, Rumania, and were described as hemorrhagic encephalitis. Then in the winters of 1915 to 1917, 40 cases diagnosed as subacute encephalomyelitis developed along the Western front in France. An account of these cases was published by Cruchet and his coworkers shortly before von Economo's excellent description of the early cases in Vienna in 1917. To these cases von Economo applied the term "encephalitis lethargica," and to the end he upheld the use of this name. However, he stated that the early cases under his observation had a widely varying symptomatology, although profound somnolence was often an outstanding symptom. At present for

many reasons the term "epidemic encephalitis" is preferred. As time went on the disease spread to England, and the observations by certain English writers that lethargy, asthenia, and cranial nerve palsies constituted the typical triad of symptoms has led to many errors of omission in diagnosis.

The first cases to be diagnosed in New York City occurred in the fall of 1918, and these were largely of the meningeal type.

These statements are made not because they are in any way new, but to emphasize the widely varying symptoms that were present even in the small groups of early cases.

Attempts have been made to divide epidemic encephalitis into types, and elaborate classifications have resulted from these efforts. However, many cases could not be included in any type, and other cases in the course of the illness ran through several types. Therefore it seems inadvisable to try to classify the cases with any degree of exactness. Of course, certain broad and general descriptive terms may be retained. For example, it is logical to call cases in which the meningeal symptoms predominate "epidemic encephalitis, meningo-encephalitic type," and cases with evidence of cord involvement "epidemic encephalitis, encephalomyelitic type." Aside from these sub-divisions,

\* Presented at a Special Session of the American Public Health Association on Epidemic Encephalitis (under the auspices of the Health Officers Section) at the Fifty-second Annual Meeting in Indianapolis, Ind., on October 19, 1933.

I should prefer to call all other cases simply "epidemic encephalitis."

That the acute stage of encephalitis is often undiagnosed is apparent to any one who has worked with patients in the chronic stage of the disease. Not infrequently these patients give a history of some mild febrile attack which escaped diagnosis altogether, or was called influenza. Sometimes careful questioning elicits the fact that this febrile attack was accompanied by transient blurring of vision, or diplopia, or by delirium, or by unusual drowsiness, and it becomes evident that a diagnosis of epidemic encephalitis should have been made at the time. In other instances, however, the initial illness was evidently so mild that it seems quite likely that no definite diagnosis could have been made. Occasionally patients are seen who experienced a period of diplopia or other visual disturbance without any other symptom and who remained ambulatory. Later, symptoms of the chronic stage developed.

It is therefore evident that we are dealing with an infecting agent—probably a virus—which may invade the body, producing at first only mild systemic symptoms or affecting only a small local area in the brain without systemic symptoms. Or it may go on—accompanying general symptoms of greater or less severity—to invade any part of the central nervous system. In some of these respects it resembles the action of the virus of poliomyelitis. But the similarity between the two stops sharply at this point. The localizing tendency of the virus of poliomyelitis is much more sharply defined than that of the virus of encephalitis, and the period of its activity is limited—with very rare exceptions—to a few days. Poliomyelitis never presents the highly varied and bizarre clinical picture that often appears in epidemic encephalitis. Moreover the virus of encephalitis in

many instances has a tendency to lie dormant for months or many years, later flaring up abruptly into a true exacerbation—which may or may not resemble the original acute attack—or beginning to smolder, slowly but relentlessly, producing the symptoms of what we term the chronic stage of the disease.

It has often been noted that in the various waves of epidemic encephalitis there have been different outstanding groups of symptoms. This does not connote in any way that different causative agents have been at work. Different epidemics of poliomyelitis have shown quite wide variations in symptomatology. The same is true of influenza, in regard to which we can speak less confidently on account of our lack of knowledge of the etiological agent.

Mention must be made of the Australian X-disease in 1917 and 1918. It occurred in hot, dry seasons. There was a case fatality of 70 per cent. Nearly 50 per cent of the cases were less than 5 years of age. The symptoms—convulsions, muscular rigidity, coma, mental confusion, and high fever—in no way suggested poliomyelitis, nor did the fact that 2 of 35 recovered cases had some form of mental disorders resulting from the disease. In a third case typical Parkinsonism had developed 21 months after the initial attack. Indeed the symptoms and the residuals fit in very well with a diagnosis of epidemic encephalitis. On the other hand, the lesions in the brain were considered by Flexner to be more characteristic of poliomyelitis. But are the lesions of the two diseases sufficiently different to base the diagnosis on these grounds alone? I have always thought that this outbreak may very well have been epidemic encephalitis.

Summer encephalitis, so-called, in Japan presents interesting problems. Some Japanese writers incline to the opinion that this is a disease entity dif-

ferent from epidemic encephalitis. Others believe it is a special form of the disease and they call it "epidemic encephalitis—Type B." Epidemics of greater or less extent have apparently occurred in Japan from time to time during the hot seasons since 1871. The most severe outbreak was in 1924, when nearly 7,000 cases were reported, with a case fatality of about 60 per cent. The greatest incidence and the heaviest mortality were in the older age groups, in patients more than 60 years of age. Kaneko and Aoki believe that this condition is not so infrequent in young people as the statistics indicate, but that it runs a milder course and is more frequently undiagnosed.

The clinical picture of summer encephalitis is characterized by a more acute onset, more marked meningeal symptoms, a greater tendency to delirium and hyperkinetic phenomena or to coma and greater muscular rigidity, than is the so-called winter encephalitis or Type A. Paralysis of the eye muscles are rare in Type B and common in Type A, while paralysis of the muscles of the head and extremities are more frequently found in Type B than in Type A. Kaneko and Aoki state, however, that there are numerous transition cases, and that the seasonal distribution does not always hold—a disease picture very similar to Type B may occur in the colder seasons and one resembling Type A in the summer. Moreover, Parkinsonism, which the authors do not believe follows Type B, is frequently observed in the districts infected with Type B. It is stated that Type B may be followed by neurasthenic symptoms, headache, sleeplessness, irritability, and, particularly in children, changes in mentality and personality. All these manifestations are now considered characteristic of the chronic stage of epidemic encephalitis. Furthermore in 1919, in different regions where Type B appeared in small

epidemics in the summer, cases of Type A were observed the following winter.

The pathological lesions of the two types appear to differ only as to location and degree and not absolutely in these respects. Indeed Flexner expressed the opinion that the pathological changes closely resembled those found in the European and American cases of epidemic encephalitis.

As more careful and comprehensive studies have been made of the central nervous system in cases of epidemic encephalitis, it has been found that the lesions in most cases are scattered throughout the entire brain and in some instances involve the spinal cord. Consequently there is a swing away from the original conception that localization of lesions in the basal ganglia was a characteristic of the pathology of the disease.

When one considers all these points, it seems reasonable to believe that summer encephalitis in Japan is, in fact, epidemic encephalitis of the meningo-encephalitic type.

My personal experience with epidemic encephalitis dates from the fall of 1918. During that time 11 cases were seen by our division. None of these presented the triad of symptoms described by the English physicians. Nine showed indications of meningeal involvement, and 10 changes in the sensorium. There was no disturbance of vision. In 3 cases there were changes in the reaction of the pupils. In 1 instance there was limitation of the motion of the eyes. Cranial nerve palsies, not involving the eye muscles, were noted in 3 instances and other paralysis once. Changes in the reflexes occurred in 8 cases but no pathological reflexes were noted.

As time went on the preponderance of different symptoms varied. In general, meningeal symptoms have been present in roughly 50 per cent of our cases each year since 1918. Changes in

the sensorium, drowsiness, stupor, irritability, delirium, maniacal states, in all possible combinations and progressing from one to another in the same patient, have constantly been found in a large percentage of patients up to 75 or 80 per cent. Disturbances of vision began to appear in 1919 and were present in about 18 per cent of the cases. They have never occurred in more than about a third of the patients in any year. These disturbances of vision include blindness, usually temporary, blurring, diplopia, and rarely a curious condition in which objects seem very small, as if the patient was looking through a concave lens.

Changes in the pupillary reactions, limitations of the motion of the eyes, and other cranial nerve paralyses have been present in from a half to three-quarters of our patients. Changes in the superficial and deep reflexes have occurred in about these same proportions. One of the most constant changes has been diminution or loss of the abdominal reflex. The changes in the deep reflexes have included increase, decrease, and inequality. Pathological reflexes have been noted in a fifth or less of the cases. An interesting fact about both changes in reflexes and pathological reflexes has been their variability from day to day or even from hour to hour. Indeed this rapid change is characteristic of most of the signs and symptoms in epidemic encephalitis.

Paralysis or paresis of muscles, other than those supplied by the cranial nerves, were most frequently noted in 1921, in 1923, and thereafter in about 10 to 25 per cent of cases. These paralyses were more often of the spastic than the flaccid type. In some instances they resembled a hemiplegia following a cerebral accident. Sensory changes have been noted in a small number of cases, usually not more than 10 per cent each year.

We saw no cases with convulsions in 1918. Since that time they have occurred in varying numbers of cases up to perhaps 20 per cent in some years.

Tremors or twitchings of groups of muscles began to be a not infrequent symptom in 1919, being present in a fifth or less of the patients.

Changes in muscle tone, spasticity or the lead pipe rigidity were noted in a small number of cases each year since 1918. Catatonia was occasionally observed.

Speech difficulties of various types were occasionally noted. A small number of patients complained of tinnitus, and in two or three instances there was some degree of deafness. Other patients apparently had an increased acuity of hearing and were greatly distressed by ordinary sounds.

It is, of course, impossible to refer to the many unusual symptom that occurred.

The onset was slow in somewhat more than half the cases. Headache was an almost constant feature, as was also some type of fever. Gastrointestinal disturbances were common, of which obstinate constipation was most frequent.

Looking back over the past 15 years, I should say that we have seen in New York a fair representation of epidemic encephalitis in its multitudinous form. I am convinced that only a small percentage of cases are diagnosed in the acute stage. Some no doubt are too mild to admit of a definite diagnosis. But many physicians seem to be so impressed with the importance in diagnosis of that dramatic triad—lethargy, asthenia and cranial nerve palsies—that they are unwilling to diagnose cases in which this does not occur. While these symptoms are almost conclusive evidence of epidemic encephalitis, it is my opinion that they are found in a relatively small percentage of cases.

We have never had a real epidemic

of encephalitis in New York City, and—except for those few early cases in 1918 of the meningo-encephalitic type—we have dealt with all kinds of types. But always there has been a fair representation of the meningo-encephalitic type.

In consequence I was not surprised to see the patients in St. Louis conforming so strictly to that type. The acute onset, the headache, the fever, the stiffness of the neck and spine, the Kernig, the absence of abdominal reflexes, the occasional changes in the deep reflexes, the low incidence of ocular disturbances or cranial nerve palsies, the drowsiness or stupor, the less frequent restlessness or delirium, the obstinate constipation, the short course in patients without other complications, were all characteristic of this type of the disease. Indeed this form is usually considered the most benign, both in its acute stage and in regard to the probability of later developments.

The points about the epidemic that did seem to me unusual were, that it occurred in hot weather, that the age incidence was so high, and that there were so many colored patients. Among

more than 1,200 patients observed by either our division of acute infections of the central nervous system or by the Matheson Commission, there have been no more than 5 or 6 negroes. It may well be that they were better diagnosed during the epidemic in St. Louis.

It may be of interest to note—though it has no particular bearing on the title of this paper—that I have found in our records 12 instances in which patients had both poliomyelitis and encephalitis. In 9, poliomyelitis developed first and in 3 encephalitis was followed by poliomyelitis.

It is evident that during the past 18 years there has been a world-wide incidence of unusual involvements of the central nervous system. We are forced to one of two hypotheses—(1) that during this time there has been an infecting agent attacking any part of the central nervous system and giving rise to highly varied clinical pictures. (2) That there have been several infecting agents, equally widespread and giving rise to much the same pathological reactions in the central nervous system. Of these the first hypothesis seems the more logical.

## DISCUSSION

RALPH S. MUCKENFUSS, M.D.

*Assistant Professor of Medicine, School of Medicine, Washington University  
St. Louis, Mo.*

WHEN the laboratory investigation of the epidemic of encephalitis in St. Louis was centralized in a committee by the Metropolitan Health Council, the work was organized into three branches. One division undertook the study of the pathology of the disease; a second division studied clinical laboratory data; and a third division investigated etiology. These

were not sharp divisions of personnel, but were the three lines along which studies were to be pursued.

In carrying out this plan, a letter was sent to the hospitals in the metropolitan area suggesting a minimum routine for the laboratory study of cases, and requesting that members of the committee be notified of autopsies so that material for study could be collected. The num-

ber of cases made available in this way made it possible to exercise more care in the selection of material for experimental work.

It seemed obvious that a study of the etiology of this disease should not be undertaken in too great a spirit of optimism, but that the work should be planned in such a manner that negative results would be significant. Accordingly blood, spinal fluid, and autopsy material were carefully cultured, with negative results except for rare instances in which the small numbers and variety of the bacteria recovered justified considering them either secondary invaders or contaminants.

The failure to demonstrate any cultivable organism that appeared to be of etiological significance led to the belief that the causative agent was probably a filterable virus. Since herpes virus has been drawn into discussion

most frequently in connection with studies on the etiology of encephalitis, an effort was made to isolate it by the inoculation of a number of rabbits and some cebus monkeys. The uniformly negative results of these inoculations would seem to justify the conclusion that herpes virus does not play an etiological rôle in the St. Louis epidemic.

Animals of a wide variety have been inoculated in an attempt to isolate a virus of etiological significance. Any detailed report of the experimental results at this time would be premature, except to say that some of the findings are encouraging. A number of rhesus monkeys have shown elevated temperatures accompanied by weakness, incoördination and tremors. Pathological examination of these animals showed changes consistent with human encephalitis. This work has not progressed far enough to permit definite interpretation.

THEODORE C. HEMPELMANN, M.D.

*St. Louis, Mo.*

IT has been my privilege to see a large number of the cases of encephalitis in St. Louis from the very outset of the epidemic down to the present time. The larger part of these was seen at the St. Louis Isolation Hospital, where, to date, we have had 318 cases. Of these, 68 have died, making a mortality rate of about 21 per cent, and 197 have been discharged, with 53 still remaining in the hospital.

When the first cases were brought to the hospital, before we were aware of the presence of an epidemic, we commented on the striking similarity, in certain respects, between these patients and those we saw 3 and 4 years before during an extensive measles epidemic when there was a surprisingly large number of cases of post-infectious encephalitis following measles and other infectious diseases. In both there were

the abrupt onset, headache, vomiting, drowsiness, and mental confusion with frequent aphasia and tremors, all of which were followed in most instances by rapid improvement, usually within a period of 10 days to 2 weeks. It soon became apparent, however, that this type of encephalitis was entirely different from the others, and moreover, was present in epidemic form. The commonest symptoms of the disease, as we have observed it, have been a rather abrupt onset, with high fever ( $104^{\circ}$ – $105^{\circ}$ ), headache, and stiff neck, although rigidity of the neck has occasionally been absent even in cases of considerable severity. At this time, too, some degree of nausea is apt to be present, and within a few hours many patients develop mental confusion and disorientation, aphasia, and tremors of the hands, tongue and lips. Drowsiness

was common, but coma was rarely so deep that the patient could not be aroused sufficiently to comply with simple requests. In some instances, however, instead of drowsiness, there was hyperirritability and hyperexcitation. Delirium occurred, but was rarely violent or noisy except in the case of alcoholics.

One of the most interesting points of the epidemic, however, was the very small number of patients who showed ocular manifestations. When these occurred, perhaps the commonest was slight blurring of vision for a day or two at the onset of the disease, and even less frequently transient double vision from involvement of the ocular muscles. I can recall no instance of well defined ptosis in the entire series of cases observed. Mild degrees of exophthalmos were noticed in a number of instances, but it was difficult to determine whether these had been present but unnoticed before the illness, or were the direct result of the encephalitis. In one case, however, a woman had been operated upon some months previously because of an exophthalmic goiter, but some degree of exophthalmos and persisted. Following the sudden onset of encephalitis, there was a rapid increase in the exophthalmos, so that the eyes seemed protruded entirely out of the orbits, making it impossible to close the eyelids. This patient died within a few days of the onset, but no autopsy was obtained.

Among the other less frequently observed symptoms were vertigo early in the disease, disturbances of hearing (noises and partial deafness), ataxia of the upper and lower extremities, and paralysis, the latter usually represented by a facial weakness, or spastic paralysis of one or more extremities.

In practically all cases, lumbar puncture revealed a marked increase in the spinal fluid cell count, and often surprisingly high, so that counts of 300-

500 were occasionally seen, and in one instance 1,100 cells per cu. mm. Rarely the first tap revealed a normal fluid, but when repeated a day or two later the typical increase in cells was noted. The cells were predominantly lymphocytes, it being very exceptional to find much increase in the polys, although in a few cases the first tap showed 30-50 per cent polys, with subsequent punctures revealing fluid which conformed to the usual type. The spinal fluid sugar was normal or slightly elevated.

In the neurological examination, probably the most constant deviation from the normal was an absence of abdominal reflexes during the acute stage of the disease, although exceptions were found to this rule, especially in children. The Kernig was positive in the majority of cases, although occasionally slight or absent despite pronounced nuchal rigidity and high spinal fluid cell count. Pathological toe signs were found rather frequently, but apparently bore no relation to the severity of the disease. Fundus examinations in the first 60 cases revealed nothing of consequence except frequent engorgement of the retinal vessels. The pupils were usually quite small but not pin-point, and reacted to both light and accommodation. Several of our patients had a marked ataxia of the cerebellar type, but coarse or intention tremor of the hands was less frequent than one made up of finer movements.

In the uncomplicated cases of encephalitis, it has seemed to me that the temperature curve is rather characteristic. At the onset of the encephalitic symptoms the temperature is usually high, approaching  $104^{\circ}$ - $105^{\circ}$  F., but following the peak, a step by step fall occurs, so that the normal is reached within about 6-10 days. There were occasional exceptions to this in which the febrile course was more prolonged or, less frequently, fell by crisis. Subsequent elevations usually denoted the

presence of complications. It may be of interest to mention the fact that herpes labialis was encountered in a very small percentage of cases.

Although in many cases, the first symptoms noticed were definitely of the encephalitic or meningeal type, in a number of others these were preceded by what appeared to be a definite period of invasion. In such instances there were commonly a moderate amount of fever and headache, "grippy" pains in back and limbs, chilly sensations, and often a sore throat or, less frequently, other mild upper respiratory symptoms. Photophobia and slight conjunctivitis were not infrequently seen at this stage, but real rhinitis or pronounced cough and bronchitis were very rare. Although some patients had a slight rigidity of the back or neck even at this stage, this was usually so slight as to be overlooked in the usual examination. This "period of invasion," if it may be called such, lasted as a rule from 1 to 4 days, during which time the temperature tended to become lower and the patient's malaise and general discomfort were definitely lessened. Then, with the onset of the encephalitic syndrome, there was again a marked exacerbation of the temperature, headache, stiff neck, and all the other typical symptoms.

In contrast to these two types, mild forms of the disease were encountered which were diagnosed only with the greatest difficulty. Such patients had fever and usually some headache, but lacked the tremor and mental confusion which might have given the clue to the disease. Often a very slight neck rigidity or the mere presence of fever of unknown origin prompted the lumbar puncture which revealed the charac-

teristic increase in lymphocytic cells. It seems probable that many such cases were missed entirely.

Following an illness as severe as this one, the rapidity of recovery was frequently little short of amazing. Even in cases of considerable severity, in many instances the patients had apparently returned to normal within 10 days to 2 weeks. Indeed, in the 197 cases discharged after a 3 weeks' isolation period, all but a very few seemed to have recovered completely, except for a varying amount of general weakness. This relative absence of residual effects is in striking contrast to what is usually seen in epidemic encephalitis, but whether or not sequelae will develop in the future no one would be justified in predicting. In a few instances mental confusion persisted longer than this period, and among the other symptoms which were slow in clearing up may be mentioned nervousness, irritability, and weakness of the facial muscles.

Of the 318 cases of encephalitis treated in the St. Louis Isolation Hospital up to October 9, 1933, 68 died; but only 8.8 per cent of the deaths were from uncomplicated encephalitis. Of these 68 who died, 69 per cent had broncho-pneumonia, 39 per cent nephritis, and 23½ per cent both nephritis and pneumonia. The deaths by decades are of interest and were as follows:

	Age	Percentage Mortality
1st decade	(0-10 yrs.)	0.0
2nd	" (10-20 yrs.)	2.5
3rd	" (20-30 yrs.)	5.1
4th	" (30-40 yrs.)	3.4
5th	" (40-50 yrs.)	19.5
6th	" (50-60 yrs.)	24.5
7th	" (60-70 yrs.)	51.0
8th	" (70-80 yrs.)	60.8
9th	" (80-90 yrs.)	66.6



## DISCUSSION

HOWARD ANDERSON McCORDOCK, M.D.

*Department of Pathology, Washington University School of Medicine  
St. Louis, Mo.*

THE pathological lesions found in the fatal St. Louis cases have been similar to those described in previous epidemics of acute encephalitis. The only consistent abnormality apparent to the unaided eye was an intense congestion of the meningeal and intracerebral blood vessels. In addition to this vascular congestion, many of the brains from severe cases showed small hemorrhages in the meninges. Cross-sections through the fresh brain revealed congested intracerebral blood vessels, which gaped open and oozed blood. The cerebral cortex often showed a decidedly pink hue instead of the normal gray color. In some cases, the entire cortex was pink, but in others this change was patchy in distribution. This pink blotching was also seen in practically all severe cases, in the pons and basal ganglia. Small petechial hemorrhages were seen a few times, especially in the pons. The most characteristic gross lesion seemed to be the pink discoloration of the gray substance. It was also occasionally seen in the spinal cord.

Microscopical sections show essentially the same changes that have been described by different observers in previous epidemics, the three features of most importance being the vascular congestion, cellular infiltration and evidences of toxic degeneration in the nerve cells. The blood vessels and capillaries are usually markedly distended. The pink discoloration of the gray substance that was seen with the naked eye was due to capillary congestion. Small petechial hemorrhages in the brain tissue similar to those seen in

poliomyelitis are occasionally encountered. Usually, however, the hemorrhage is confined to the perivascular lymphatic space.

The cellular infiltration is of two types. Practically all cases show the typical perivascular collection of lymphocytes and other types of round cells. This lesion is especially conspicuous in the pons and basal ganglia, although in a few cases it is present also in the white substance of the cerebral hemispheres, and in the spinal cord, particularly in the cervical region. In addition to this perivascular cellular infiltration the more severe cases show small focal collections of cells scattered throughout the brain substance. Many of these foci are found in the cerebral cortex and some are situated close to the meningeal surface. They also occur in the midbrain and in the basal ganglia. These cellular foci are not situated about blood vessels, but they seem to have been attracted to areas where necrosis has occurred in the brain tissue. They resemble the glia stars described by the neuropathologists. The remains of a degenerated nerve cell can often be found at the centers of these cellular foci.

Various degenerative changes are found in the nerve cells. Although no particular region of the brain seems to be exempt from this degeneration, the brunt of the attack appears to be borne by the nerve cells in the midbrain and basal nuclei. The nuclei of the cranial nerves are not especially involved. The degenerative changes are those ordinarily observed in nerve cells, namely swelling and eccentricity of the nucleus,

chromatolysis and, in the end, neuronophagia.

Bacteria or other microscopic organisms have not been observed in the brain tissue. In severe cases the lesions in the nervous system are widespread, and are not confined to the midbrain or basal ganglia. A study of many cases gives one the impression that the process in the brain is not one that first starts in the midbrain or basal ganglia and spreads from there to the rest of the brain; but that it is a diffuse process which apparently begins simultaneously in many regions of the brain.

In severe cases, lesions are found in other organs. In the viscera the changes resemble those seen in fatal cases of septicemia and consist of

petechial hemorrhages in the serous surfaces and in the mucous membranes. There is often a hemorrhagic and edematous type of pneumonia similar to that seen in individuals dying early in the course of acute epidemic influenza. The kidney in many instances is swollen, the blood vessels are intensely congested, and, on section, the cortex shows cloudy swelling. The kidney pelvis is also congested and may show petechial hemorrhages. Microscopically the epithelium lining the convoluted tubules sometimes shows degenerative changes. Intranuclear inclusion bodies have been found in the cells of the tubular epithelium of the kidney in about one-quarter of the cases so far examined.

THOMAS M. RIVERS, M.D.

*Rockefeller Institute for Medical Research, New York, N. Y.*

THE epidemic in St. Louis is an excellent example of the harmonious coöperation of local physicians, local health officers, and federal authorities. The investigators have been exceedingly generous with material useful for experimentation obtained during the outbreak of encephalitis.

The facts presented indicate that the epidemic disease occurring in St. Louis is caused by an infectious agent. The question naturally arises as to what kind of an infectious agent is responsible. Infectious agents are usually classified as protozoa, fungi, bacteria, spirochetes, rickettsia, and viruses, and from previous experiences coupled with data presented at this time one is led to suspect that a virus is probably the etiological agent responsible for the epidemic under discussion.

Then comes the question—What kind of virus is inducing the disease? A word should be said regarding the kinds of viruses from which one may choose. First, we have viscerotropic virus dis-

eases as exemplified by measles and yellow fever; second, there are viscerotropic and neurotropic virus maladies as seen in canine distemper and hog cholera; finally, some viruses, *c.g.*, rabies, are entirely neurotropic. It is not absolutely essential that a disease be established in an experimental animal in order to obtain an idea about what part of the body is attacked by an infectious agent, because this fact can be ascertained by a study of the lesions produced by a disease in its natural host, and Dr. McCordock's remarks concerning pathological changes in organs other than the brain are interesting and significant. It is clear that the virus responsible for the St. Louis epidemic invades the brain, but it has not been definitely established that other organs are not also involved. In other words the virus under discussion may be an agent with viscerotropic as well as neurotropic qualities.

From the epidemiological standpoint, it is essential to ascertain, if possible,

whether the St. Louis virus is purely neurotropic, because, if it is only neurotropic, the likelihood of its appearance in the blood stream and of its transmission from person to person by means of blood-sucking insects is remote. Therefore, once the purely neurotropic qualities of a virus have been established, the epidemiologist can more or less disregard insects in his search for the modes of dissemination of the etiological agent in a population.

In spite of the fact that one cannot as yet be certain of the qualities of the virus causing the St. Louis epidemic, it seems that all of the observers are agreed that the clinical and pathological pictures presented by the cases are those of an encephalitis. There seems to be some difference of opinion, however, as to whether this outbreak is similar to that described by Economo and known as epidemic encephalitis. To make a positive statement at this time concerning the relation of the two maladies would be a mistake. Such a remark gains force when it is remembered that the tissues of the body—this is particularly true of the brain and cord—are capable of responding to injury in a limited number of ways. For instance, different viruses may cause similar clinical pictures; the viruses of poliomyelitis and rabies (Trinidad outbreak) at times produce an ascending

involvement of the cord and brain known as Landry's paralysis. Although the clinical pictures under these conditions are indistinguishable, they are, nevertheless, produced by different etiological agents. Furthermore, the same virus can and often does produce different clinical pictures in the same species of host. This fact is well exemplified by recent experiences with louping ill (a natural virus disease of sheep) in man, a host responding to the infection with a clinical picture similar to that of influenza, epidemic encephalitis, or tuberculous meningitis. Therefore, in view of the fact that one may obtain a false impression through the classification of diseases, particularly the encephalitides, based solely on clinical and pathological pictures, it seems best to wait for the results of further work on the etiology of the St. Louis encephalitis before a definite decision is reached concerning its relation to other diseases in which an inflammation of the central nervous system is a prominent if not the only demonstrable feature. Finally, I trust that I am not too optimistic when I take the remarks of Dr. Muckenfuss regarding the experimental work in animals to indicate that we may hope for a rapid clarification of the situation based on the identity of the etiological agent.

# Production of Antitoxins by Means of Bacteriophage<sup>\*</sup>

N. W. LARKUM, PH.D.

*Michigan Department of Health, Lansing, Mich.*

THE theoretical basis for the clinical application of bacteriophage has been a stumbling block in the way of its widespread use and general acceptance. The idea that any biological product could eliminate an infection by dissolution of the organisms concerned without damage to the tissue cells of the host was too fantastically simple to arouse much enthusiasm among many physicians and found little more favor in the more esoteric group of those who devise and carry out experiments. Nevertheless an idea so attractive could not fail to receive attention, and so for 15 years medical literature has contained a very respectable number of articles concerning bacteriophage therapy.

Had clinical trial resulted in failure, bacteriophage no doubt long since would have been found in that limbo where rest so many so-called biologicals that were born to abbreviated lives. As report follows report in the medical journals, however, it becomes apparent that bacteriophage is being more and more extensively applied and month by month is finding greater favor. Meanwhile, the physician, the investigator, and the teacher await a development which will reconcile the reported therapeutic results with the known activities of the bacteriophagic principle.

At the moment there exist several theories concerning the mechanism of

bacteriophage therapy. By far the greatest proportion of those who use bacteriophage at all do so in the hope and expectation that the principle coming into contact with the infecting bacterium will destroy the organism and hence free the patient from infection. The bacteriophage used must be able to lyse the organism causing the infection, must come into contact with the organism, and must bring about lysis in the situation where the organism is found. All conditions predisposing against lysis, such as inoculation of repeated doses which produces an antilytic serum, must be avoided. Despite the attacks to which this theory has been subjected, attacks which render the position all but insupportable, it is upon this foundation that bacteriophage therapy today largely rests.

Opposed to this concept are those who claim that lysis is but one of the manifestations of bacteriophage action, that lysis probably seldom occurs under the condition existing in the body, and that bacteriophage therapy if of value at all, owes its success to some other activity of the principle. As one of this group, I have consistently maintained that bacteriophage was of value chiefly through its ability to lyse bacteria *in vitro*, thus putting the bacterial antigen into soluble form and hence forming a vaccine, and that bacteriophage therapy was primarily vaccine therapy. At the same time, as clearly stated in a recent paper,<sup>1</sup> I pointed out that there were other

<sup>\*</sup> Read before the Laboratory Section of the American Public Health Association, at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

activities of bacteriophage that might play a rôle in the recovery of the patient. By taking this stand it was possible to tie up bacteriophage therapy with a widely used if dubiously regarded practice, namely, vaccine therapy. As a justification for this attitude, the *Journal of the American Medical Association*, which has consistently opposed bacteriophage as a therapeutic agent, has recently acknowledged that there may be some justification for its use in the preparation of bacterial antigen.<sup>2</sup>

But while using the vaccine assumption as a means to the end of attempting to explain the apparent success of bacteriophage therapy it has always appeared that there was something resident in the bacteriophage itself of considerable significance. The observed effects in the patient following the use of bacteriophage were too dramatic, and too rapid to be explained solely on the basis of specific bacterial antigen therapy. If lysis by the bacteriophage did not occur in the patient, and it was a simple matter to demonstrate in many instances that it did not occur, some other activity must be accorded to the bacteriophage in order to account for the results. However much this may have been getting the cart before the horse with respect to the development of a new therapeutic procedure, it has had the virtue of leading to results as will appear later.

In most if not all infectious diseases the picture both clinically and pathologically is that of a more or less severe toxemia. The local lesions produced by bacteria are seldom of a serious nature, and as a rule do not occur at all until late in the disease. In typhoid fever, for example, there is little or no damage attributable to the bacillus itself until long after the patient has been seriously and critically ill. In pyelitis, the presence of colon bacilli in the kidney pelvis produces a reaction

scarcely detectable upon microscopic examination of the tissue involved, yet the patient may be seriously, even critically ill. This is certainly no new concept of the mechanism of bacterial infection, yet it is surprising how much our efforts in the treatment of bacterial infection have been directed toward getting rid of the bacterium and how little toward combating the toxin. It is perhaps significant that where success has attended the development of specific methods for the treatment of infectious diseases it has been in infections caused by organisms from which soluble toxins could be obtained and antitoxins developed. Failure to succeed in other instances has been caused by our inability to produce toxins which are incidental to the production of antitoxins.

To return again to the subject of bacteriophage, it has been apparent that the clinical use of this principle has suggested its rôle as a producer of antitoxins. Although its use in typhoid fever has been extremely limited, those who have injected typhoid bacteriophage into patients early in the disease have noted particularly the cessation of toxic symptoms. The bacteria did not disappear; in fact, the duration of the disease as measured by the persistence of the organisms in the feces was not shortened, but the patients were not sick in the accepted sense of the word. In the treatment of pyelitis and cystitis with bacteriophage, the most striking observation is the subsidence of symptoms. Bacteria remain in the urine for varying intervals following injection of bacteriophage, but the patient is clinically well. Similar observations in connection with other infections serve but to emphasize the point that the use of bacteriophage either neutralizes the toxins present or stimulates the rapid production of antitoxin.

In view of the long period over which bacteriophage has been studied it might

be expected that the apparent relationship between bacteriophage and toxin would have been investigated. As a matter of fact it was, and the results were so unanimously against antitoxic effect that the problem was regarded as solved. Very early in his work on bacteriophage, d'Herelle<sup>3</sup> reported that when the serum of rabbits inoculated with Shiga bacteriophage was injected into other rabbits, these second animals showed increased susceptibility to Shiga toxin. Hence the conclusion was drawn that bacteriophage did not produce antitoxin. Likewise both Gratia<sup>4</sup> and Hauduroy<sup>5</sup> and later d'Herelle showed that rabbits injected with repeated doses of staphylococcus bacteriophage developed a hypersusceptibility to staphylococcus infection, particularly to toxic effects of such infection. Observations such as this encouraged no expectation that bacteriophage was either antitoxic or capable of producing antitoxin. Furthermore, for those organisms producing exotoxins suitable bacteriophages have not been readily obtained except in the case of Shiga dysentery where there is no simple method of evaluating the potency of the toxin *in vitro*. Hence there has been no method for direct study of the problem.

But clinical experience over a period of several years has led to skepticism regarding the development of hypersusceptibility in individuals receiving repeated inoculations of staphylococcus bacteriophage, and within the past year, with Miss Corpron<sup>6</sup> I reported results exactly opposite to those of Gratia, Hauduroy and d'Herelle concerning the effects of repeated and large doses of staphylococcus bacteriophage in rabbits. Our animals developed a degree of immunity and showed especially, resistance to staphylococcus toxin. Furthermore, the work of Burnett<sup>7</sup> and his co-workers, and of Dollman<sup>8</sup> made available a toxin (staphylococcus) which

could be easily measured and which was produced by an organism against which a highly active bacteriophage was available. These facts together with clinical observation over several years led to an investigation of the relationship between bacteriophage and bacterial toxin.

The results of this investigation follow. Details may be found in a preliminary report recently published.<sup>9</sup> Staphylococcus toxins having titers of from 1:100 to 1:500 were prepared. These titers are measured by the dilution in which toxins produce hemolysis of rabbit red blood cells in 1 per cent suspension. It should be noted that the hemolytic titer of staphylococcus toxin is closely correlated to the dermo-necrotic and lethal properties of the toxin. Hence while the hemolytic property is easily measured, conclusions based on the results are applicable to the other properties of the toxin.

Staphylococcus bacteriophage is not a toxin since it has no hemolytic power and is innocuous to rabbits. When bacteriophage is combined with staphylococcus toxin, no reduction in the hemolytic or dermo-necrotic power of the toxin is observed. Hence, bacteriophage is not itself an antitoxin. When, however, rabbits are immunized with staphylococcus bacteriophage, their serum is capable of neutralizing staphylococcus toxin with respect to both hemolytic and dermo-necrotic properties of the toxin. This antitoxin is produced rapidly and to a reasonably high titer.

These results were obtained with the stock bacteriophage such as has been used during the past 7 years by the Michigan Department of Health and distributed for use in treatment of staphylococcus infections. It contained staphylococcus antigen, metabolic products of staphylococci and the nutrient medium in which the phage was prepared in addition to the lytic prin-

ciple itself. Obviously no conclusion as to the rôle of bacteriophage in the production of staphylococcus antitoxin could be attempted unless the experiments were performed with bacteriophage free from these associated products. Staphylococcus bacteriophage was accordingly purified by the method of cataphoresis described by Kreuger and Tamada<sup>10</sup> and rabbits were injected with the purified products. Serum from these rabbits neutralized staphylococcus toxin, thus showing that the antigenic stimulus to the production of antitoxin was the bacteriophage itself.

Having then demonstrated that staphylococcus bacteriophage is an antigen capable of producing staphylococcus antitoxin, there remains the question as to how far generalization may be based upon this discovery. It has already been pointed out that bacteriophage for *B. typhosus* and the colon bacillus when used therapeutically had the effect of abating the toxic symptoms in the patient. Streptococcus phage has the same property. It seems logical then since the problem is not yet susceptible to direct experimentation to make the tentative conclusion that all bacteriophages are capable of

producing antitoxins. In the event that this conclusion is verified there now exists the means specifically to combat most if not all known bacterial infections, prophylactically by immunizing with bacteriophage, therapeutically by injecting serums prepared by immunizing animals with bacteriophage. At the same time there is now put into our hands the means of standardizing bacteriophage products, determining adequate and reasonable dosage and studying quantitatively the results obtained in a given patient.

#### REFERENCES

1. Larkum, N. W. Bacteriophage in clinical medicine. *J. Lab. & Clin. Med.* 17:675 (Apr.), 1932.
2. Editorial. Bacteriophage therapy. *J.A.M.A.* 100:1431 (May), 1933.
3. d'Herelle, F. *The Bacteriophage and Its Behavior*. Baltimore: Williams and Wilkins, 1926.
4. Gratia, A. La Lyse transmissible du staphylocoque et ses applications thérapeutiques. *Compt. rend. Soc. de biol.* 86:276, 1922.
5. Hauduroy, P. Sensibilisation d'animaux à certaines infections par une vaccination anti-bactériophage. *Compt. rend. Soc. de biol.* 90:290, 1924.
6. Larkum, N. W. and Corpron, Ruth. Effect of massive and repeated doses of bacteriophage. *J. Bact.* 25:77 (Jan.), 1933.
7. Burnett, F. M. The exotoxins of *Staphylococcus pyogenes aureus*. *J. Path. & Bact.* 32:717, 1932.
8. Dollman, E. C. Staphylococcus antitoxin. *Canad. Pub. Health J.* 23:125, 1932.
9. Larkum, N. W. Relationship of bacteriophage to toxin and antitoxin. *Proc. Soc. Exper. Biol. & Med.* 30:1395 (June), 1933.
10. Kreuger, A. P., and Tamada, H. T. The preparation of relatively pure suspensions of bacteriophage. *J. General Physiol.* 13:145, 1929.

## Peru Child Welfare Clauses in the Constitution of 1933

THE constitution promulgated in April, 1933, states that the protection of the physical, mental, and moral health of children is the primary duty of the State. The State must also safeguard the child's right to home life, education, vocational training, and assistance in case of illness or neglect. The State shall intrust these tasks to qualified technical agencies.

Primary instruction is to be com-

pulsory and free. At least one school must be established in each community with 30 children of school age; this includes farming, mining, and industrial communities. In each department at least one school for vocational education is required.

The State shall enact legislation for the care of public and personal health and for the protection of labor.—Official text of the Constitution.

# The Need of an Index Statisticus\*

A. W. HEDRICH, Sc.D., F.A.P.H.A.

*Associate in Biostatistics, School of Hygiene and Public Health,  
Johns Hopkins University, Baltimore, Md.*

THERE is a story of a ship's cook, who accidentally dropped a silver spoon into the sea. When called to account, his defense was that the spoon wasn't lost—nothing was lost so long as one knew where it was.

Each year, there is produced in the public health and related fields, much valuable statistical information which is doomed to a rôle similar to that of the silver spoon. The difficulty is not so much with the standard table, published year after year, but mainly with the more unusual, or occasional table—a type that is often most informing.

To illustrate: In preparation for a published study, Dr. A. W. Freeman<sup>1</sup> in 1916 searched for tables of the case fatality of typhoid fever by age; he found only one. Fifteen years after publication, a very desirable table of this type was brought to him, which had been published in the 1908 *Annual Report* of the New York City Health Department. He had actually looked through some of the volumes of the New York reports, but the table had been published only once, and had, therefore, been missed by him.

As a second example, a search was once made in our department during practically a solid week for a certain life table which had been published in an out-of-the-way place.

It even happens that information will

be laboriously tabulated from one section of a voluminous publication, such as the decennial census report, and later it is found that the same information is present in more desirable form in another section of the same publication. Instances of such difficulties with raw material could be multiplied indefinitely.

There are a number of reasons for this state of affairs. One is, that volumes are not always indexed adequately as to statistical content; another is that there is for the statistical field no consolidated index, such as exists for certain other fields.

*Indexes to individual volumes*—Turning to annual reports, we sometimes find that there is no index at all, or that the index titles are too vague. Thus, a highly important table, showing the completeness of birth reporting, may be indexed only under "R," for the title "Report of birth index clerk." Accurate and meaningful titles for tables are the first requisite to an index, and proper cross-indexing is a second. Thus a table showing *populations*, *deaths* and death rate from all causes, by color, sex and *economic status*, should at least be indexed under the words that have been italicized, and, in some instances, under the other headings also. It is especially important to cross-index for the more unusual variates; for this reason, economic status was stressed in the example given.

The form of index followed in U. S.

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.



EXHIBIT II

Table 1: Population by Color, Nativity, Sex and Age

Table 1: Population by Color, Race, and Age													
Area and Age	All Classes		Native White—Native Parentage		Native White—Foreign or Mixed Parentage		Foreign-Born White		Negro		Other Races		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	
Total...	Explanatory text. . . . . 2, 5, 6, 9												
Under 1 year...	Detail for five-city area and for Cleveland, Lakewood, Cleveland Heights, East Cleveland, and Shaker Heights: 1930. . . . . 5, 6												
1 to 4 years...	Detail for each of the 252 census tracts: 1930. . . . . 73-123												
5 to 9 years...	Detail (excluding age) for each census tract: 1920. . . . . 216-218												
10 to 14 years...	Detail (excluding age) for each census tract: 1910. . . . . 231-232												
15 to 17 years...	Total. . . . . 12												
18 to 19 years...	Geographical distribution, Negro population, in 1920 (map). . . . . 12												
20 to 24 years...	Geographical distribution, Negro population, in 1930 (map). . . . . 13												
25 to 29 years...	Negro population (a special study). . . . . 9												
30 to 34 years...	Negro population, 25 census tracts with highest percentages: 1930, 1920, 1910. . . . . 9												
35 to 44 years...	Other races, the composition (Mexican, Indian, Chinese, Japanese, and others). . . . . 2												
45 to 54 years...	Total. . . . . 11												
55 to 64 years...	Geographical distribution, Negro population, in 1910 (map). . . . . 11												
65 to 74 years...	Total. . . . . 11												
75 and over...	Geographical distribution, Negro population, in 1910 (map). . . . . 11												
Unknown. . . . .	Total. . . . . 11												

Mortality Reports and in the Vital Statistics Report of New York State has much to commend it for annual volumes. We find, for example, such entries as the following:

EXHIBIT I

Rabies, deaths from, 25, 99, 106; by age, 198, 223, 502; by race, 198, 220, 502; by sex, 198, 220, 502; in urban and rural districts, 166.

—, death rate, 99.

If one wishes to find rabies deaths by age, race and sex, he will look for such table on page 198 or 502, since those numbers appear under all three headings. This arrangement saves much time in referring. It would also be possible to index such tables somewhat as follows: Rabies, deaths by age-race-sex \* 198, 502.

Howard W. Green has used an interesting form of reference guide which is perhaps more of a table of contents than index. An example is shown in Exhibit II.

Cumulative indexes—The usefulness of the statistical material of periodic reports can further be increased by the preparation of cumulative indexes, which might, in one way or another, be brought to date every 5 or 10 years. As an experiment, the author prepared such an index of *U. S. Mortality Reports* from 1900 to 1929, which revealed interesting information, whose existence had not been suspected. After completion of this index, it was dis-

\* The hyphens are suggested to indicate cross-tabulation. "Deaths by age-race-sex" implies complete cross-tabulation, e.g., where it is possible to find deaths of white males of given age. If the table showed whites by age, and males by age, but not the triple grouping described, its title would properly be, "Deaths by age-color, and age-sex." This distinction between partial and complete cross-tabulation may at times be important, since the peculiar usefulness of a given table may hinge solely upon an exceptional degree of cross-tabulation. In indexes to single volumes, confusion upon such points may not give serious inconvenience, but in more comprehensive indexes the distinction becomes more important.

covered that Dr. J. V. DePorte, Chief of the Division of Vital Statistics of the New York State Health Department, had prepared a similar index of the same volumes,\* and was preparing a cumulative index of the statistics of his own Division, also. Apparently, therefore, interest in information of this sort is not confined to one person. The writer would appreciate information as to other departments which have made, or are planning to make cumulative indexes of their statistics.

Exhibit III shows a few titles selected to illustrate a form of cumulative index. The meaning and purpose of the symbols in brackets will be discussed below. They are not a necessary part of the title, although useful for certain purposes.

#### EXHIBIT III

##### *Occupation*

Deaths by age-cause-occupation-sex in the Registration Area (28 Causes of death given) 1908 and 1909. Table 11, males; table 12, females. [D:ados.†]

Deaths by age-occupation-sex and by occupation-race-sex in the Registration Area, 1908 and 1909. Table 9, males; table 10, females. [D:aos;ors.]

##### *Parent Nativity*

Deaths by age-nativity-parent nativity of foreign born-race-sex, in each state of the Registration Area. (Race includes, White, Negro, Indian, Chinese, Japanese.) Annually, 1900-1910; and 1916-20. [D:anpRs:s.]

##### *Race*

Deaths by age-cause-race in each state of the Registration Area. (Race is separated only for states having about 10 per cent, or more colored.) Annually, 1906-1929, except 1921 and 1922. [D:adr':s.]

*Ibid.*, for each city of 100,000 population. Annually, 1906-1929. [D:adr':u.]

Deaths by age-cause-race-sex in the Registration Area. Annually, 1923-1929. [D:adrs.]

See also under "parent nativity." [D:anpRS:s.]

\* This index has subsequently been published.<sup>3</sup>

† The symbol *d* (suggesting disease) is used for cause of death, as *c* would, too often, suggest "color."

For convenience, the symbol for "Registration Area" is omitted, that area being understood unless otherwise specified. Separation by states or cities is, however, indicated after the second colon, as shown in the later examples.

It will be found convenient in preparing a cumulative index, to begin by making out an index card for each table in each volume, showing title (verbal or symbolic), year, table number, and page limits. Additional cards are usually necessary for use in cross-referencing.

For some purposes a tabular index, as illustrated in Exhibit IV, is a helpful preliminary to Form III. The parallel column form (IV) has the advantage that omitted years are readily detected, and that long time series can sometimes be built up from shorter series, that are sufficiently similar.

In Exhibits III and IV, table titles are shown in symbolic as well as verbal form. Among the advantages of symbolic titles are the following:

1. As they are much shorter than the equivalent verbal titles, they save much time, effort and space, in writing and re-writing titles on index cards, etc.
2. They permit indexing of even complex titles with the same definiteness, and in much the same manner as words are indexed in a dictionary. Note the alphabetic arrangement of symbolic titles in Exhibit IV.
3. Being very compact, symbolic titles can sometimes be made to convey a quantity of information which would make verbal titles unbearably long.

A brief outline of a code for writing symbolic titles is given in the Appendix.

*More comprehensive indexes*—It would appear worthwhile to consider whether a consolidated, international index of statistical material for the demographic field as a whole is not practicable. The desirability of such an index need hardly be argued. The field of general literature has its reader's guides; the medical field has its *Quarterly Cumulative Index Medicus* and other indexes,\* but there is no single place to which one can go with

\* The Statistical Handbook Series of the League of Nations Health Organisation (Geneva) is of interest in this connection; likewise, the practice in such abstract journals as the *Bulletin of Hygiene* (London), of reprinting tables of importance.

## EXHIBIT IV

Column	(1)	(2)	(3)	(4)	(5)	(6)
Symbols	D:adaNbs	D:ados	D:adr'e	D:adr'	D:ar	D:ar'
Subject	Deaths	Deaths	Deaths	Deaths	Deaths	Deaths
Demog. distribut'ns	age-cause-nativity-sex	age-cause-occupation-sex	age-cause-race	age-cause-race	age-race	age-race
Place distribut'ns	-	-	States	Cities 100,000+	States, cities, counties	States, cities 10,000+
Place Totals	Registration Area	Registration Area	Registration Area	-	Standard summary	Standard summary
Years	Table Number and Page Limits					
1906			7:362-395 <sup>f</sup>	8:396-450	2:258-287	
1907			7:386-423	8:424-478	2:282-311	
1908		11,12:606-629	7:482-523	8:524-603	2:368-401	
1909		11,12:726-779	7:596-639	8:640-721	2:473-509	
1910	13:586-597 <sup>d</sup>		8:360-454	9:455-501	3:204-251	
1911			6:354-465	7:466-512	-	1:150-173
1912			5:146-254	6:255-301		1: 28-49

a. Abridged list, or less detail than standard (underscored or italics).

b. Greater detail than usual or standard (capital letter).

c. Race shown in areas containing 10 per cent colored, or more.

d. The first figure represents table number; the second and third, initial and final page numbers.

e. Standard summary comprises national aggregates for Registration Area, Registration States, Urban and Rural Parts of Registration States, and Cities in Non-Registration States.

f. 1906 does not have aggregate for Registration Area included in table.

reasonable assurance of finding references to statistical tables of desired content. Is it not possible to develop some form of *Index Statisticus*, which will bring to the field of public health statistics the benefits that have accrued to medicine from comprehensive indexing? The type of index considered would resemble the *Surgeon General's Catalogue* somewhat, in that it would summarize a fairly long time period.

An experimental approach toward an *Index Statisticus* is being made with the aid of the statistical library of the School of Hygiene and Public Health,

where reports are on file from various parts of the world. As assistance is as yet limited and intermittent, the work must progress slowly, and be selective in several respects. It is hoped, however, that this experiment will help to suggest ways of making statistical resources more accessible.

## SUMMARY

At present, much valuable statistical material is practically inaccessible for want of proper indexes.

Compiling offices can help to remedy the situation by better indexing of

annual volumes, and through preparation of cumulative indexes of their series.

The question is raised whether it is not possible to provide an international statistical index for public health and related fields. The experimental beginning of such an index on a restricted scale is reported.

A symbolic code for indicating the content of tables is given in the Appendix which aims to give greater compactness, specificity and indexing facility, than is possible with conventional verbal titles.

#### REFERENCES

1. Freeman, A. W. Case fatality in typhoid fever. *Pub. Health Rep.* 31, Pt. 2:3356-8 (Dec. 8), 1916.
2. Green, H. W. *Population characteristics by census tracts*. Cleveland, Ohio, 1930. Cleveland: Plain Dealer Pub. Co.
3. DePorte, J. V. *Guides to Vital Statistics in the United States*. Vol. III in the President's Research Committee on Social Trends, 1933. Amer. Statistical Assn., 236 Wooster St., New York City. 38 pp. (\$50.)

#### APPENDIX—PROVISIONAL CODE FOR SYMBOLIC TITLES

As the symbolism here used is still in developmental form, only a few explanatory comments will be offered at this time.

1. *Symbols*—It is obvious that letters are used in place of the significant words of the title, initial letters when possible. Thus the symbolic title, D:ars:s, is derived from the italicized letters of the following verbal title, *Deaths: by age-race-sex: in states*.

Ordinary time or incidence rates take a super bar over the subject symbol; e.g.,  $\overline{D}$  = death rates;  $\overline{C}$  = case rate. Simple ratios may be expressed as such; e.g., the prevalence of illness, or proportion of the population ill at a specific point of time =  $C/P$ ; case fatality =  $D/C$ .

2. *Sequence*—Colons separate the three parts found in most titles, viz., (a) the subject or thing counted, as births, deaths, etc., (b) the distributions (separations) or specific attributes, as

age and cause of death, but excepting (c) place and time specifications, respectively, which are placed last. The indicated sequence clearly follows the usual order in titles. Subdivision by colons makes it possible, when necessary, to use the same letter in different positions to represent different words. Thus, in D:ads, D in the primary position represents deaths; in the secondary position, disease (or cause of death). Similarly in the example of section 1, s in the secondary position stands for sex, whereas in the place position (tertiary) it can only mean states. In practice, these duplications will be found not to give much difficulty.

To facilitate indexing, symbols between colons are arranged alphabetically, e.g., D:aos rather than D:aoas.

3. *Detail*—Small letters for distribution symbols indicate the standard or usual degree of detail. Capital letters represent greater detail than standard, hence the large letter suggests a large table.\* Italics, or underlined letters, represent sub-standard titles.

The standards proposed are less difficult to remember than might be thought at first, since they are the forms most frequently encountered. For age, the standard distribution calls for single years to four, and a total number of classes of at least fifteen; for cause of death the standard is the current *International List*; for race, white and colored; for nativity, native and foreign born; for urbanization, urban and rural.

As example: In Exhibit IV, title

\* A relatively simple, but still useful code can be based upon the Appendix text above the asterisk in section 3, plus section 6 and possibly 5. The resulting symbolic titles will usually be at least as specific as conventional verbal titles. The paragraphs relating to sub-standard distributions (italics) and incomplete cross-tabulation (primed letters) cover refinements, which, although important at times, demand added skill and time in their application. It is believed that super-standard detail, symbolized by capitals, should be indicated even in the simplest index. The capital letters will often call attention to rare information, which might otherwise be missed.

(1), *D:adNs*, we find italic *a* and *d*, because age and disease are given in abridged distribution. Capital *N* is used because the table gives nativity in super-standard detail: viz., by the individual countries of birth.

*Single classes* are indicated by subscripts; e.g., male sex only =  $s_m$ ; colored race only =  $r_c$ .

4. Adjacent letters, i.e., those not separated by punctuation marks, (e.g., *adr*), imply cross-tabulation (see first footnote of main text). Incomplete cross-tabulation may be indicated as in the second title of Exhibit III [*D:aos:ors*], or by "priming" the symbols of attributes not crossed with all others; e.g., *D:a'osr'* for the title just cited.

5. *Class interval and range*—When it is necessary to specify class interval

and range, (most often for place or time) parentheses are used in the tertiary position, the first symbol in parenthesis representing class unit, and the second, range. Example: *Deaths: by age-sex, in each state of the United States: yearly, 1925-1930* = *D:as:(s,U.S.)(y,1925-30)*. Ordinarily, the symbol may be omitted for the area accepted as standard in a given index (e.g., a national or state registration area).

6. *List of symbols*—The following list of symbols is incomplete but will suffice for many simple indexes. More specific information, e.g., as to standards and subscript symbols, is available on request to the author.

*Note:* The author is indebted to Dr. Lowell J. Reed for criticisms and suggestions.

Primary (subject) symbols	Secondary (distribution) symbols	Tertiary symbols
B = births	a = age	A. <i>Place distributions</i>
B <sub>s</sub> = stillbirths	co = climatic factors	n = nations
C = cases	d = diseases; cause of death	s = states or provinces
D = deaths	d'' = joint causes	u = cities of 100,000 population or over
D <sub>i</sub> = infant deaths	h = residence allocation (home)	U <sub>10M</sub> = cities of 10,000 population and over
D <sup>P</sup> = standardized death rate†	i = income or wealth indexes	k = counties
$\bar{D}$ = corrected death rate†	k = completeness of reporting	t = permanent census tracts
E = life table (expectation)	l = legitimacy	w = wards
F = families or households	m = marital state	Z or $\Sigma$ = sum
G = growth data and body measurements	n = nativity	Z <sub>u,s</sub> = sum of cities and sum of states†
I = migration (in or out)	o = occupation	
M = marriages	p = parent nativity	B. <i>Time distributions</i>
P = population	q = other hereditary factors	h = hours
Y = other subjects*	r = race	d = days
	s = sex	w = weeks
	u = urbanization	m = months
	w = seasonal distribution	y = years
	y = other distributions*	5y = quinquennia

\* For use with superscript referring to footnote.

† As defined in Pearl's *Medical Biometry and Statistics*. In these, and other hypothetical rates, a superscript is used to indicate the statistical element of the local community which enters the hypothetical rate. For example, the superscripts *P* and *D*, respectively.

‡ Summations lead to rather complex titles: their symbols can often be omitted without serious loss.

# "Missed" Epidemics of Septic Sore Throat

PAUL B. BROOKS, M.D., F.A.P.H.A.

*Deputy Commissioner, New York State Department of Health;  
Secretary-Treasurer, International Association of Dairy  
and Milk Inspectors, Albany, N. Y.*

FROM time to time efforts have been made to compile, from official reports and current literature, lists of milk-borne epidemics recorded as having occurred in the United States. The latest comprehensive report which has come to our attention was that prepared by Armstrong and Parran and published in a *Public Health Report* in 1927. This listed 42 milk-borne outbreaks of septic sore throat as having been recorded in a period of 19 years.

*Public Health Reports* record 30 milk-borne epidemics of septic sore throat as having occurred in the subsequent period 1927-1932 inclusive. The following list, with the states arranged in order of population, represents the total recorded in the two periods.

1. New York .....	18
2. Pennsylvania .....	2
3. Illinois .....	3
4. Ohio .....	4
5. Texas .....	1
6. Massachusetts .....	27
7. Indiana .....	1
8. Wisconsin .....	3
9. Minnesota .....	1
10. Iowa .....	1
11. Maryland .....	1
12. Connecticut .....	4
13. Maine .....	1
14. Oregon .....	2
15. New Hampshire .....	1
16. Vermont .....	2

Total ..... 72

All of the New York state epidemics have occurred outside of New York City and therefore in an area including less than half of the state's population. This tends to equalize the population factor. Sixty-three per cent of the recorded epidemics are "credited" to 2 states, Massachusetts and New York. Eight states have recorded only 1 epidemic and 32 none.

From the record, showing epidemics to have occurred in all sections of the country—North, East, South, and West—it seems evident that there are no climatic conditions anywhere in the United States which insure freedom from this type of infection. Although state lines obviously offer no bar to the spread of infection, there is a marked and as yet unexplained disparity between the numbers of epidemics recorded in certain adjoining states.

There seem to be at least 4 possible factors which might contribute "jointly or severally" to the disparities: (1) Incorrect diagnoses or epidemics erroneously classified as milk-borne, in states recording the larger numbers. (2) Infection more prevalent in some states than in others. (3) Epidemics prevented in some states by effective "milk control." (4) Epidemics overlooked.

For No. 1, we can speak authoritatively only for New York. We have been careful to include in our lists only authentic milk-borne epidemics of septic

sore throat. It seems reasonable to assume that the same care has been used elsewhere. Certainly no state is anxious to be "credited" with epidemics.

It is conceivable that infection might be more prevalent in some sections than in others or that the udders of certain breeds of cattle or of animals under certain conditions of intensive breeding for high milk production might be more susceptible to infection than others. We know of no evidence supporting these possibilities.

Regarding No. 3, we know of no "control" measure practicable for general application, other than pasteurization, which will prevent these outbreaks. In New York, in the aggregate, something less than 20 per cent of milk sold in the cities, exclusive of New York City, is unpasteurized; in the suburban and rural areas it is, roughly, around 50 per cent. If the states with few or no epidemics recorded had a much greater relative proportion of pasteurized milk, this might be significant. If so, it might be expected that Massachusetts, with 9 more epidemics than New York, would show a materially smaller proportion.

About a year ago, addressing an organization of milk control officers in a state which had recorded 2 epidemics to our 18, in the period of approximately 25 years, we expressed the belief that epidemics were being missed. This conclusion was based in part on the fact that 2 of our most serious epidemics had been under way for about 1 and 2 weeks, respectively, before they were "discovered" by the State Department of Health. How many we may have missed entirely in 25 years, we do not know, but it is perhaps a suspicious circumstance that from January 1, 1917, to the end of 1922, none were recorded, whereas in 1929, 1930, and 1931 we recorded 3 in each year. As a result of recent experiences our tentative belief as to epidemics

being overlooked has become almost a settled conviction.

Probably few states are more thoroughly organized for the discovery of outbreaks than New York. All local health officers, approximately 900, are physicians, required to possess certain public health qualifications and removable for cause by the State Commissioner of Health. Fifteen district state health officers, experienced officials, have immediate supervision over their work. Physicians are required by law to make immediate reports to the health officers of cases of communicable disease. The local health officers are in turn required by the state sanitary code to report to the district state health officers cases of certain diseases, including septic sore throat, and also, by telephone or telegraph, outbreaks of any "undiagnosed febrile disease." There are in the state approximately one hundred local laboratories under the general supervision of the State Department of Health; many of them receiving state financial aid on the condition that certain fairly high standards of efficiency have been met. An intensive effort has been made, particularly in the past 4 or 5 years, to bring about the prompt discovery and thorough investigation of all outbreaks of communicable disease, and some of us have been particularly interested in those which might be milk-borne.

On June 13, through a letter from a local resident, the department learned for the first time that there had been an unusual number of cases of sore throat in 2 adjoining rural summer resort villages in northeastern New York. On investigation it developed that between March 13 and June 14 there had been a milk-borne epidemic of approximately 137 cases of septic sore throat, the peak having been on May 20. The health officer's excuse for failing to report cases or any unusual incidence of sore throat was that the

county laboratory had reported negatively on cultures examined for hemolytic streptococci. This laboratory is in charge of an experienced full-time medical bacteriologist and pathologist and has an excellent reputation.

On July 11 the department learned of an outbreak of 17 cases of septic sore throat which had developed a week before in a rural village in the southern part of the state. No report had been received from the health officer. He had recognized and investigated the outbreak, and suspended the sale of milk under suspicion, but the outbreak probably would have gone unrecorded if the department had not heard of it indirectly. It is of interest to note that in 1929 this same village had a milk-borne septic sore throat epidemic of 141 cases.

In July the department learned of an epidemic of at least 200 cases of sore throat, associated with fever and glandular enlargement, which began in May and had nearly subsided when it came to our attention. This was in a

village in western New York. No cases had been reported. Up to the time of writing this outbreak does not appear to have been milk-borne; it is mentioned simply because of its belated discovery.

While we find some consolation in the belief that no milk-borne epidemics of septic sore throat occurring in the state in the past few years have been completely missed, it is evident that when any considerable number can be overlooked even for a matter of weeks the machine is not "hitting on all four." To find and correct the cause of the "skips" is one of our present problems. At the same time, notwithstanding its weak spots, we know that we have a fairly effective organization, relatively speaking, for discovery and control of epidemics. If they can be overlooked here, the same thing can happen—and probably is happening—elsewhere. The record is valuable, so far as it goes, but probably incomplete. The question as to how this condition can be corrected is one in which all of us should be interested.



*Memorial Banquet in Honor of Dr. Walter Reed and His Associates on the Yellow Fever Commission at Indianapolis, October 11, 1933*



## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMANN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, Dr.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, Dr.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

EMERY R. HAYHURST, M.D., Ph.D., AND LEONARD  
GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## THE SIXTY-SECOND ANNUAL MEETING

AFTER 33 years, our Association has met once more (for the third time) in Indianapolis, and it is not too much to say that it will go down in history as one of the most successful ever held anywhere. The chairman of the local committee, Dr. William F. King, and his aides have made every provision for our comfort and the successful conduct of the meeting. Too much cannot be said in praise of the general arrangements and of the hospitality shown by the people of Indianapolis. An exceptionally good press had been obtained with the result that not only professional people in the city, but the citizenship in general showed great interest in what was going on.

The scientific program was of a high standard of excellence, but the two outstanding features of the meeting were the symposium on epidemic encephalitis given on Tuesday night and the memorial banquet held on Wednesday evening in honor of Dr. Walter Reed and his associates.

The symposium on encephalitis is the first official publication given out on the investigations by the health officials of the City of St. Louis and those of the Public Health Service sent by the government. The hall was packed and the interest shown was intense. We are publishing the papers elsewhere in this issue. We may add that in investigations of this sort, results cannot be obtained for weeks, or perhaps months, but the material given was up-to-date, and constitutes a most valuable contribution to the study of this interesting and more or less mysterious disease.

The Walter Reed Memorial Banquet will go down as a historical event. Its peculiar interest was due to the fact that the first announcement made by Dr. Reed concerning his work was given in 1900 at the meeting of our Association

in Indianapolis. In addition to its significance, the banquet was a brilliant affair. The large dining room was filled to capacity and the close attention shown by everyone, lay and professional, was proof of the interest excited by the event. It was impossible for the older members not to feel some touch of sadness because all members of the Reed Commission are now dead, and of the volunteers who offered themselves for experimental purposes but 4 were present: Dr. Robert P. Cooke, Mr. Levi E. Folk, Mr. John R. Kissenger, whose wife was with him, and Mr. Charles J. Sonntag.

Every attempt was made to obtain the attendance of those who were present at the meeting in 1900, as well as those who were members of the Association at that time. Only 9 were at the meeting. A special table was arranged for them. Mrs. John N. Hurty, the widow of the Health Officer of Indiana, who was our official host in 1900 and who is so well remembered for his excellent work, graced the occasion and was seated with the old members. It may be added that of 19 officers, many of them connected with the Army, serving in Cuba under General Wood in various capacities, mentioned in the report of the Secretary of War, Elihu Root, for 1902, only 3 are known to be living.

The chief address, excellent, and charmingly delivered, was given by Major-General Robert U. Patterson, Surgeon-General of the United States Army. Our knowledge of yellow fever was brought up to date by General F. F. Russell (Retired), whose work on yellow fever under the Rockefeller Foundation is so well known. In connection with the memorial session, the Association is particularly indebted to Brigadier-General Jefferson R. Kean, who was in Cuba while the Reed Commission was working there and who aided it in many ways. His interest in this memorial meeting was as keen as that of anyone and through him we got into touch with practically all army officers of that date who are still living.

Messages of congratulation were received from many parts of the world. Among these we may mention especially those from Major-General Frank McCoy, aide to General Leonard Wood in Cuba, and General M. W. Ireland, formerly Surgeon-General of the Army. From Canada came the warmest greetings from many important organizations and universities. From England, a fine letter was received from Sir George Newman, Medical Officer of the Ministry of Health. Elihu Root, Secretary of War during the time of the Cuban work, sent a most appreciative letter to us through General Kean. For Mexico greeting was brought by Dr. Manuel Madrazo, executive officer of the Federal Department of Health. Another greeting came by letter from Dr. Monjaras who has been a faithful member of our Association for many years and who is remembered with affection by all fortunate enough to know him. Other letters and telegrams too numerous to mention were received and most of them were read to the audience and broadcast.

A storm of applause greeted the following message from President Franklin D. Roosevelt, sent to us directly by the hand of General Patterson and read by Dr. John A. Ferrell, President of our Association:

I have just learned that your association will hold a memorial session to Dr. Walter Reed on Wednesday evening, October 11, 1933, at Indianapolis. This nation today shares with the world untold benefits to public health resulting from the monumental work of Major Walter Reed, United States Army. In definitely establishing the fact that the mosquito is the transmitting agency of yellow fever, he earned the gratitude of humanity. I take great pleasure in joining with you in honoring the memory of this great American.

The roll of honor was read by Dr. William F. King and the survivors were

introduced to the audience. Everyone stood and they were greeted with rounds of applause which lasted many minutes.

Not only were we fortunate in holding our meeting in Indianapolis, where so much connected with the history of yellow fever has been announced, but Indianapolis, itself, was fortunate in again being the scene of such an occasion.

The exhibits in Indianapolis were excellent and were not so badly affected by the depression as we had feared. There was a series of scientific exhibits. These were well arranged and reflect great credit on those who provided them. The commercial exhibits were excellent in character and covered almost every activity in which health officers and health workers, generally, are interested.

The meeting in Indianapolis will be remembered by all who were fortunate enough to attend and will take its place alongside of that of 1900 on account of the special features mentioned.

## DEPRESSION AND HEALTH IN ENGLAND

WE have stated in previous articles that the health of our nation has not been affected adversely by the depression, floods, and subsequent droughts as much as health officers expected. We have also given one article showing that in Philadelphia, at least, some malnutrition attributable to the adverse conditions were being noticed. We have been taken to task privately for such statements, though they have been backed by reports which were considered authentic. We now have the statistics on this point from England by the Chief Medical Officer of the Ministry of Health for the year 1932, which are not only surprising but also a matter for congratulation. The Chief Medical Officer states unequivocally "The exceptionally good health of the English people continues to be maintained." He points out that this is a "coldly accurate statement" in spite of the fact that in March, 1933, there was published in a report a statement that "The stark reality is that in 1933, for the mass of the population, Britain is a hungry Britain, badly fed, clothed, and housed."

Giving in detail the facts on which this opinion is based, the Chief Medical Officer quotes reports from 23 districts in England, all made by trained officers of health or by school medical officers. A number of these give comparative observations made by the same man over a period of 9 or 10 years, and the general conclusion is reached that any marked degree of malnutrition among children is not evident. There are cases of decided malnutrition in unemployed men and particularly in women. Some of the symptoms which lead to these conclusions are considered, such as anemia, which is comparatively rarely seen as a result of unemployment. A general incapacity for work is seen mostly in married men, past middle life, who are the heads of large families, and in such cases is contributed to by worry and anxiety. There is noted an increase in the incidence of anxiety neurosis. Among men who show incapacity for work are those who in the past have done very heavy manual labor, such as working on docks and in the mines. They have become physically soft chiefly through idleness. One of the most striking symptoms is the slowness of the recovery-reaction. The observers attribute this not so much to the insufficiency of nourishment as to psychological factors, such as lack of incentive.

The report makes no effort to conceal the untoward social results of unemploy-

ment and industrial depression, though it considers them unassessable. It points out that all observations are based on indisputable statistics collected by competent and skilled observers. The death rates have been steadily declining to the end of 1932, which is as far as this report carries us. It is recognized that there may be much impairment of efficiency and even sickness without the end result of death. Nevertheless, the death rate is one criterion which is absolute, as pointed out by Farr. "There is relation," he said, "betwixt death and sickness; and to every death from every cause there is an average number of attacks of sickness, and a specific number of persons incapacitated for work."

Two features are especially noticeable—the infant mortality has declined to 65 per 1,000 births as compared to 67 for the last 5 years, and secondly, the health of school children is remarkably good. In London children in the 8- and 12-year age groups, male and female taken together, were found to be in better condition than in 1931. There was 1 less per 1,000 found in the subnormal group. These results are attributed to various causes, but chiefly to the fact that the health defenses of the country have been effective and afford a great degree of security in times of special difficulty and danger.

It is especially noticeable also that the English people are learning more of the art of living. Five million children per year have had instruction for something like 25 years through the School Medical Service, and results are now showing. Also there are the Maternity and Child Welfare Services and the School Medical Service which are changing the physical outlook of the people. The nation as a whole has become more health conscious and more humanitarian. For something like 40 years the housing problem has been improving. Approximately one-fourth of the whole population has been rehoused in new or reconditioned dwellings since the World War.

Altogether the report under consideration is distinctly encouraging and England is to be congratulated on the good showing. It is a demonstration of the effectiveness of her method of selecting her health officials, and of the permanence of tenure they enjoy.

## TUBERCLE BACILLI FROM THE BLOOD STREAM

A FEW years ago Professor Loewenstein and his coworkers astonished the scientific world by claiming to have cultured the tubercle bacillus from the blood of patients suffering from a number of different affections, many of them not at all connected with tuberculosis. For example, in 82 cases of polyarthritis, tubercle bacilli were cultured from the blood in 56. He claimed also to have demonstrated the organisms in the exudates in the joints. Again in tuberculosis of the skin, tubercle bacilli were cultivated in 62 per cent of 66 cases. In another series of 51 cases, the blood of 38 gave positive cultures and it was concluded from these findings that tuberculosis of the skin is a chronic bacillemia and the skin lesions were an exanthematic manifestation due to bacillary emboli. Indeed the claims were that tubercle bacilli had been grown from the blood of a number of affections not heretofore believed to have any connection with tuberculosis.

There was naturally some scepticism felt over these results. In 1932 Professor A. Stanley Griffith<sup>1</sup> requested of Professor Loewenstein a number of his cultures for investigation, and in response received 24 strains, 18 of which

were primary and the remainder subcultures from isolations made in 1930 and 1931. Of these, 11 came from cases of skin tuberculosis, 8 from polyarticular rheumatism, 2 from disseminated sclerosis, and 1 each from dementia praecox, renal tuberculosis and phthisis pulmonalis. These were cultured by Dr. Griffith and also inoculated into animals. Seventeen of them proved to be in every respect cultures of the human type of tubercle bacillus, while 7 were avian strains.

This finding opens up a new field. If further observation confirms these findings we may come to believe that a number of diseases, which heretofore have not been considered as having anything to do with tuberculosis, may be due, in part at least, to the tubercle bacillus. As varied as its manifestations are known to be and as difficult as early diagnosis has been and still is, we may be confronted with a problem concerning which much remains to be solved. There can be no doubt, however, that Professor Loewenstein, with his new culture medium and his methods, has succeeded in demonstrating far reaching activities of the tubercle bacillus which were not even suspected up to the time of his work.

#### REFERENCE

1. Griffith, A. Stanley, M.D. *Lancet*, Sept. 9, 1933, p. 592.

## LETTER FROM GREAT BRITAIN

### THE LONDON SCHOOL

#### MEDICAL REPORT

During the last few years most medical officers of health and school medical officers, having regard to the economic conditions, have made a particular point of reporting their findings in the matter of nutrition so far as children are concerned. In general they appear to have been impressed by the absence of signs of falling off, and it is practically impossible to find a report in which the note struck is other than optimistic.

Among the latest to make favorable announcement is Sir Frederick Menzies, Medical Officer of Health and School Medical Officer to the London County Council. Both general and special inquiries made during 1932 showed that "no noticeable change has taken place in the condition of the children, and that in London there has certainly not been any perceptible decline in the children's nutrition."

In regard to most other matters investigated in the case of the school children, satisfactory results are reported: the figures, in fact, are claimed

as the best attained since the inauguration of school medical inspection some 25 years ago. Reference is made to a number of special inquiries and activities that have been carried out. The methods adopted in classes for myopic children are described, and general satisfaction with the progress made is expressed.

The scheme for the control of acute rheumatism is shown to be making steady advance, a considerable increase in the number of beds for children suffering from the disease being reported. Increasing attention is being given to immunization against diphtheria, though it is doubtful if this is responsible for the fact that the disease was less prevalent in 1931 and 1932 than in other recent years.

The movement in favor of child guidance clinics is growing, and the few already established are doing most valuable work. Progress in the open-air and special schools continues to be satisfactory and, apropos the retirement of Mr. Macleod Yearsley, the consulting aural surgeon, who urged their

establishment so long ago as 1910, particular reference is made to the great success of the schools and classes conducted for the benefit of the partially deaf.

With the object of "promoting economy in the printing bill," a good deal of material that would undoubtedly have been found both interesting and helpful has been omitted. Space has been used, however, for expressing the hope that it will not be considered necessary to curtail in any essential feature work so fundamental as that of the school medical service "whose aim is to secure such a foundation of health for the industrial population on leaving school as will stand the nation in good stead in the long struggle ahead in the economic sphere."

#### UNEMPLOYMENT AND THE PUBLIC HEALTH

Sir George Newman in his annual report for 1932 "On the State of the Public Health," devotes a considerable amount of discussion to the relationship between unemployment and national health. His main concern was to discover what was to be learned from vital statistics with regard to the effect of the depression and unemployment. To this end he made an exhaustive examination of all the mortality and morbidity returns that were available and, in addition, of special reports by medical officers of health and under the national health insurance scheme.

The conclusion derived from all his examinations was that the English people, in spite of everything, continued to enjoy strikingly good health; the total death rate for the year (12 per 1,000) was exceptionally low, and the steady decline that has been going on since 1871 has not been interrupted. Of special rates, that of infant mortality is still on the low side and shows no tendency to depart from its downward trend.

Among the individual contributors to mortality in infancy there is no indication of a tendency to prominence in the case of "wasting conditions." In the general list of causes of death, suicide, it is noted, is definitely high; since 1900 the figure has doubled (5,743 in 1932 as against 2,896). That economic conditions may have had something to do with this is recognized, but there is also "the changing psychology toward the act of suicide as a means of release" to be taken into account.

Practically without exception medical officers fail to find noteworthy evidences of privation, and generally Sir George has no difficulty in answering those who are prone to be too pessimistic: the provincial medical practitioner who inclined, like so many physicians, to base conclusions upon inadequate premises, proclaiming that "malnutrition is widespread (in spite of statistics to the contrary) among both children and adults," and those who issued in March, 1933, following a relative study of English public health and housing since 1844, a statement, so very obviously arrestingly phrased, to the effect that "the stark reality is that in 1933, for the mass of the population, Britain is a hungry Britain, badly fed, clothed and housed."

#### DISEASE INCIDENCE

Perhaps it is because in connection with his unemployment investigation he had to follow such lines, but on this occasion Sir George's report seems to deal more than usual with death and disease, and the provision of hospitals. It is not especially depressing therefore, however, largely because his figures in the main are quite satisfactory.

In the matter of communicable disease, for instance, it is noteworthy that he is in a position to report a reduction in prevalence of nearly all the commoner infections. In the case of those affecting the nervous system the figures

were not too satisfactory, except in regard to encephalitis lethargica which returned the smallest number of cases and of deaths since 1923.

Returns as to tuberculosis afford grounds for satisfaction also, the number of notifications of new cases (69,792) being the lowest on record, and the number of deaths over 2,000 less than in 1931 (33,658 against 35,818). The fact that in the last 10 years the death rate of non-pulmonary tuberculosis has fallen by 37 per cent is again noted.

Of matters other than statistical and epidemiological dealt with, reference may be made to what is said in regard to food and nutrition. In the general press it is this part of the report, indeed, that has attracted most attention, since mention is made at some length of the ill-considered efforts of food producers—bakers, for example—to increase the vitamin D content of various articles by adding ergosterol, and criticisms are levelled against the Englishwoman's capabilities as a cook and a caterer, and English habits in relation to food: meals, says the report, are "monotonous and stale, badly cooked, unappetizing, untidily served," while consumers "bolt their food, or wash it down with tea or beer, forgetting that such a custom is unfair to the food, the tea, the beer, and the body."

#### THE MISSING SENSE AND THE CLIMATE

To anyone unacquainted with the English it would doubtless create astonishment to learn that these statements, when broadcast in the press, evoked nothing but signs of complete approval. It is notorious, of course, that your Englishman is entirely devoid of all sense of humor. He has earned and perhaps deserves this reputation, I believe, because of the seriousness he displays in the face of comment upon

certain of his characteristics, attributes and such-like products as his climate. Merely he does not react as the commentator from without expects because he agrees. He expects to be told, for example, and believes that the continental housewife and continental cookery are so much better than the home variety. He accepts and does not resent a sneer that his food habits and table manners are so much less refined than those of the Frenchman or the Italian.

To anyone with experience, of course, these statements are the supremest nonsense: of home cookery there is only one better than the English and that is the American, and in regard to food daintiness and fastidiousness the situation is exactly the same. The average Englishman has been brought up to regard himself as inferior in these respects, and there is no room for laughter but only for regret that he has been made that way, and he cannot laugh it off—any more than he can bring himself to regard his climate as a laughing matter, having to live with it and suffer its vagaries with such fortitude and philosophy as he can command.

On the subject of climate, and to permit of comment upon my personal sense of humor, I quote a statement from the annual report of the Ministry of Health in regard to the declining infant mortality rate to the effect that ". . . after the steady process of reduction in the rate during the last few decades, the variations now tend to reflect less the direct influence of maternity and child welfare work than the influence of climatic and related factors. This is shown clearly in the figures for the four quarters of the year, which were 87, 58, 49 and 64, respectively, as compared with 94, 59, 46 and 66 in 1931."

CHARLES PORTER, M.D.

*London*

## ASSOCIATION NEWS

*The Sixty-third Annual Meeting  
of the  
American Public Health Association  
and  
The Fifth Annual Meeting of the Western Branch will be  
held jointly in 1934 in Pasadena, California*

### NEW OFFICERS OF A.P.H.A.

*President*—Haven Emerson, M.D.

*President-elect*—E. L. Bishop, M.D.

*First Vice-President*—William F. King, M.D.

*Second Vice-President*—Prof. J. G. FitzGerald

*Third Vice-President*—Walter H. Brown, M.D.

*Treasurer*—Louis I. Dublin, Ph.D.

*Executive Secretary*—Kendall Emerson, M.D.

*Chairman of Executive Board*—Thomas Parran, Jr., M.D.

### *Executive Board*

Thomas Parran, Jr., M.D., *Chairman*

John A. Ferrell, M.D.

Walter H. Brown, M.D.

John L. Rice, M.D.

E. L. Bishop, M.D.

Haven Emerson, M.D.

Louis I. Dublin, Ph.D.

John A. Amyot, M.D.

W. S. Rankin, M.D.

### *New Elective Governing Councilors*

Walter H. Brown, M.D.

S. J. Crumbine, M.D.

A. J. Douglas, M.D.

A. W. Freeman, M.D.

W. H. Frost, M.D.

George T. Palmer, Dr.P.H.

Thomas Parran, Jr., M.D.

M. J. Rosenau, M.D.

Henry F. Vaughan, Dr.P.H.

C.-E. A. Winslow, Dr.P.H.

### SECOND INSTITUTE ON HEALTH EDUCATION

THE Second Institute on Health Education, held under the auspices of the Public Health Education Section, at the Indianapolis Annual Meeting, was devoted to The Psychology of Health Education. The institute lasted 3 days, commencing on Saturday, October 7, and running through to Monday, October 9. The registration for the institute numbered 56. Five sessions were held. The sessions were devoted to the consideration of:



1. Why the Psychology of Health Education

2. The Psychological Nature of the Recipient of Health Education

3. Fundamental Principles Relative to (a) arresting attention, (b) enlisting sympathy, (c) importing information, (d) leading to action

4. The Meaning and Mechanism of Motivation

One session was devoted to round table consideration and application of

the psychologic principles considered.

The institute which was favorably commented upon by the student body was directed by Dr. Iago Galdston of the New York Academy of Medicine together with Dr. H. E. Kleinschmidt, National Tuberculosis Association, and Mr. Bertrand Brown, Milbank Memorial Fund.

Abstracts on the institute procedure will be made available to the student body within a short period.

#### IMPORTANT NOTICE FOR MEMBERS WISHING TO APPLY FOR FELLOWSHIP OR LIFE MEMBERSHIP

WITH a view to accommodating eligible members who wish to apply for Fellowship and failed to submit their applications in time to be acted upon at Indianapolis, the Governing Council has given the Committee on Fellowship and Membership permission to accept Fellowship applications after the Annual Meeting, for immediate routing through the various steps incident to Fellowship election. This means that members desirous of applying for Fellowship can do so immediately and have final action taken on their applications within two or three

months, instead of having to wait until the time of the 1934 Annual Meeting.

All eligible members who wish to take advantage of this new arrangement are requested to file their completed and sponsored applications with the Committee on Fellowship and Membership not later than November 30, 1933.

Applicants for Life Membership similarly may have prompt action taken on their applications if they are submitted within the current month and accompanied by an initial payment of at least \$10.00.

#### NEW LIFE MEMBERS AND HONORARY FELLOW ELECTED AT INDIANAPOLIS

James W. Bass, M.D., Dallas, Tex., Fellow, Health Officers Section

Joseph Blickensderfer, M.D., New Philadelphia, Pa., Fellow, Health Officers' Section

Kendall Emerson, M.D., New York, N. Y., Fellow, Public Health Education Section

Warren E. Forsythe, M.D., Ann Arbor, Mich., Fellow, Public Health Education Section

W. S. Leathers, M.D., Nashville, Tenn., Fellow, Health Officers Section

Arthur T. McCormack, M.D., Louisville, Ky., Fellow, Health Officers Section

Edward L. Miloslavich, M.D., Milwaukee, Wis., Fellow, Industrial Hygiene Section

Harold H. Mitchell, M.D., New York, N. Y., Fellow, Child Hygiene Section

Peel M. Payne, M.D., Napoleonville, La., Fellow, Health Officers Section

Dr. James R. Scott, Albuquerque, N. M., Fellow, Public Health Education Section

William A. Snow, M.D., New York, N. Y., Fellow, Public Health Education Section

L. H. South, M.D., Louisville, Ky., Fellow, Laboratory Section

#### HONORARY FELLOW

Dr. William Wilson Jameson, Dean and Professor of Public Health, London School of Hygiene and Tropical Medicine (University of London), was elected to Honorary Fellowship in the Association at its meeting in Indianapolis, in October, 1933.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

*Health Officers Section*

- Walter L. Bierring, M.D., 406-6th Ave., Des Moines, Ia., Commissioner, State Dept. of Health
- Philip E. Blackerby, M.D., 4617 S. 6th St., Louisville, Ky., Assistant State Health Officer
- Henry D. Chadwick, M.D., State House, Boston, Mass., State Commissioner of Public Health
- Walter W. Council, M.D., Juneau, Alaska, Territorial Health Commissioner
- William B. Grayson, M.D., State Capitol, Little Rock, Ark., State Health Officer
- Nicholas A. Kremer, M.D., Corner Walnut and 2nd Sts., Madison, Ind., Jefferson County Health Commissioner
- George W. Larendon, M.D., City Health Dept., Houston, Tex., Director of Public Health
- Manuel F. Madrazo, M.D., Napoles No. 19, Mexico City, Mex., Executive Officer, Federal Department of Health
- J. Edwin Obert, M.D., New Egypt, N. J., Health Officer
- Carl A. Scherer, M.D., 115 Court House, Duluth, Minn., County Health Officer
- Albert W. Sweet, Court House, Freehold, N. J., State District Health Officer
- Frederick J. Swift, M.D., 2414 Kingman Blvd., Des Moines, Ia., Deputy Commissioner, State Department of Health
- George C. Truman, M.D., 103 New State Bldg., Phoenix, Ariz., Supt., State Board of Health
- Frederic W. Wersebe, M.D., Washington, Conn., Health Officer
- Johan C. Wiik, M.D., 408 Bellingham National Bank Bldg., Bellingham, Wash., Whatcom County Health Officer

*Laboratory Section*

- John H. Bailey, M.D., Municipal Contagious Disease Hospital, Chicago, Ill., Resident Physician
- Olive R. Benham, 208 Farmington Ave., Hartford, Conn., Chief Serologist, State Dept. of Health
- George P. Berry, M.D., School of Medicine, Univ. of Rochester, Rochester, N. Y., Professor of Bacteriology
- Jerome S. Chaffee, M.D., Sharon, Conn., Town Health Officer

David B. Charlton, B.A., Station A., Ames, Ia., Sanitary Bacteriologist, Iowa State College

- Ko Kuei Chen, Ph.D., M.D., Lilly Research Labs., Indianapolis, Ind. (Assoc.)
- Walter S. Davis, B.S., 686 Myrtle Ave., Albany, N. Y., Sanitary Chemist, State Dept. of Health
- Florence C. Drach, B.A., Box 1043, Monroe, La., Bacteriologist, State Branch Laboratory
- E. G. Gerwe, Ph.D., Wm. S. Merrell Co., Cincinnati, O., Director, Biological Laboratories
- Edith Haynes, Ph.D., Indiana Univ. Sch. of Medicine and Hospitals, Indianapolis, Ind., Bacteriologist
- Mary K. Higginbotham, 702 College Ave., Bluefield, W. Va., Laboratory Technician
- Allan C. Hotchkiss, B.S., 745 North Ave., Bridgeport, Conn., Chemist and Bacteriologist, Mitchell Dairy Co.
- Elizabeth McCoy, Ph.D., 412 W. Gilman St., Madison, Wis., Assistant Professor of Agricultural Bacteriology, University of Wisconsin
- Frederick M. Remer, 267 Milbank Ave., Greenwich, Conn., Bacteriologist, and State Chemist
- Thomas M. Rivers, M.D., New York, N. Y., with Rockefeller Institute for Medical Research
- William H. Seemann, M.D., 1577 Henry Clay Ave., New Orleans, La., Bacteriologist, State and City Boards of Health
- Alcor A. Shanks, Nassawadox, Va., Bacteriologist
- Frederick Smith, B.Ch., M.B., Dept. of Bacteriology, McGill Univ., Montreal, P. Que., Canada, Lecturer in Bacteriology
- William L. C. Spaeth, M.D., 5000 Jackson St., Philadelphia, Pa., Director, Clinical Laboratories, Frankford, Northeastern, Kensington and Stetson Hospitals

*Vital Statistics Section*

- George St. J. Perrott, B.A., U. S. Public Health Service, Washington, D. C., Consultant in Vital Statistics

*Public Health Engineering Section*

- G. R. Hilliker, City Hall, Fresno, Calif., City Plumbing Inspector

*Industrial Hygiene Section*

Frederick M. R. Bulmer, M.B., 100 Eastbourne Ave., Toronto, Ont., Canada, Industrial Hygienist, Ontario Dept. of Health  
 Karl L. Smith, C.P.H., 290 Congress Ave., New Haven, Conn., Assistant Engineer,  
 John B. Pierce Laboratory of Hygiene

*Food and Nutrition Section*

Glenville Giddings, M.D., Doctors Bldg., Atlanta, Ga. (Assoc.)  
 Clarence R. Probst, B.S., Route 1, Torrington, Conn., Charge Milk Department, Torrington Creamery, Inc.  
 Oscar S. Tischler, Ph.B., Kirby Health Center, Wilkes-Barre, Pa., Milk Control Officer  
 Evan Wheaton, Research Dept., American Can Co., Maywood, Ill., Bacteriologist

*Child Hygiene Section*

Albert K. Aldinger, M.D., 157 E. 67 St., New York, N. Y., Director of Health Education, Board of Education  
 Eleanor Parker, 3319 Dorchester Road, Baltimore, Md., Assistant Supt. of Nurses, Babies' Milk Fund Assn.  
 James E. Peabody, A.B., 152 Harvard St., Newtonville, Mass., Author of Text-books in Biology and Hygiene  
 Amelia T. Wood, M.D., Ball State Teachers College, Muncie, Ind., Director of Health Service

*Public Health Education Section*

Lillian W. Burton, Mt. Airy Ave., Paris, Ky., Visiting Nurse, Metropolitan Life Ins. Co.  
 Carl F. Deysenroth, 205 W. Wacker Drive, Chicago, Ill., Secretary, Milk Foundation, Inc.  
 Olive McCormick, 570 Lexington Ave., New York, N. Y., Director, Health and Safety, Girl Scouts, Inc.  
 Willard W. Patty, Ph.D., Indiana University, Bloomington, Ind., Director of Physical Welfare Training

Mary J. Walters, M.D., Vassar College, Poughkeepsie, N. Y., Assistant Physician, and Instructor in Public Health

*Public Health Nursing Section*

Agnes B. Belser, R.N., 1521 Hanover Ave., Richmond, Va., Assistant Director, Bureau of Nursing, State Dept. of Health  
 Eva D. Calhoun, 2803 Gilbert Ave., Cincinnati, O., Local Field Supervisor, Nursing Service, Metropolitan Life Ins. Co.  
 Edith S. Countryman, R.N., 612 E. 10 St., Des Moines, Ia., State Director, Public Health Nursing, State Dept. of Health  
 Helen S. Harris, R.N., Box 784, Ocala, Fla., County Health Nurse  
 Mrs. Charles H. Lyles, R.N., Williamson, W. Va., Mingo County Red Cross Public Health Nurse  
 Bessie B. Rappaport, c/o L. Elman, 581 Crown St., Brooklyn, N. Y. (Assoc.)  
 Audrey Sanger, R.N., C.P.H.N., 307 Campus Ave., Pullman, Wash., Public School Nurse  
 Rosemary Sweinhart, R.N., 326 W. Madison St., Chicago, Ill., Public Health Nurse with Borden Farm Products

*Epidemiology Section*

Archie L. Gray, M.D., M.P.H., State Board of Health, Jackson, Miss., Director, Epidemiological Unit, State Board of Health  
 James W. Jackson, M.D., 463 W. 32 St., Indianapolis, Ind., State Epidemiologist

*Unaffiliated*

Arthur Eisbein, M.D., 168 Humboldt Parkway, Buffalo, N. Y., Diagnostician, City Health Dept.  
 William J. Fordrung, M.D., Hunter College, Park Ave. & 68 St., New York, N. Y., Professor and Head of Dept. of Physiology and Hygiene  
 Thomas J. LeBlanc, Sc.D., C.P.H., M.S.P.H., Medical College, Cincinnati, O., Professor of Preventive Medicine

## ERRORS AND OMISSIONS

### SEVENTH EDITION—STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE

The following errors and/or omissions have been noted in the first printing of the seventh edition—*Standard Methods for the Examination of Water and Sewage*:

1. Omissions of items in Index.  
 Bile salt agar, 174  
 Boiler water, 157, 72  
 Carbon in sewage, 163  
 Cellobiose test, 171  
 Citrate test, 171  
 Coli-aerogenes English procedure, 172  
 Fecal and non-fecal coli-aerogenes organisms, 170  
 Ferrocyanide citrate agar, 166  
 Lactose broth buffered, 166  
 Media, bile salt agar, 174  
 Media, sulfite glucose agar, 174  
 Sodium citrate test, 171  
 Solids, total, 92, 162  
 Sulfides in sewage, 164  
 Sulfite glucose agar, 174
2. P. 29. Omission. The following sentence should be added to the footnote after the words "distilled water":  
 "The 'stock' soap solution is approximately 9 to 10 times as strong as the 'dilute standard' soap solution."
3. P. 50. Error in the footnote, the initials of Mr. Mathews should be E. R. not E. A.
4. P. 49. Error. A serious error results from omission of a decimal point. In Section 3 (Preparation of Iron Standards) line 4 should read "about 40 ml., add 0.5 ml. of 3N hydrochloric acid." The text now reads 5.0. The effect of

this is to alter materially the results obtained by the method.

5. P. 158. Omission. During the process of editing the mss. it was agreed that the following footnote should be added to this page:

"Investigations as yet unpublished indicate deficiencies in this method. Persons desiring to determine fluorine are cautioned to familiarize themselves with the literature on the subject after the date of this publication."

It was unintentionally omitted. The following will be substituted in the next printing.

"Persons interested in determination of fluorine should refer to literature on the subject of fluorine determination after 1932 especially to *Industrial & Engineering Chemistry*, Analytical Edition, Vol. 5, 1933, pp. 234 and 236."

6. P. 163. Error in bibliography. "Fairshall" should be Fairhall.
7. P. 166. Error in bibliography. "Dominik" and should be Dominick.

Those possessing copies of the seventh edition are requested to enter the corrections in their copies. Further errors, when and if noted, should be brought to the attention of the undersigned promptly so that corrections can be made before the second printing.

JOHN F. NORTON, PH.D.,  
 Upjohn Company,  
 Kalamazoo, Mich.

# PUBLIC HEALTH ADMINISTRATION

**Extension Course for Health Officers**—The New York State Department of Health in coöperation with the Albany Medical College has announced its extension course qualifying physicians for the position of local health officer in communities with less than 50,000 population. The purpose of the instruction is to prepare physicians to assume the office of health officer in such towns, villages and consolidated health districts. The course itself is divided into three parts. Approximately 120 hours of special readings including 20 written tests are first required. This is followed by 8 full days of conference and field work under the leadership of one of the district state health officers. Finally, 1 full week of residence at Albany affords an opportunity to study the clinical aspect of public health work, participate in laboratory work, and observe the administrative phases of the state and local health services.

**Tuberculosis Service in Metropolitan New York**—The association of tuberculosis clinics in New York City reports that in 1932, 53,509 persons attended the chest clinics of that city. There were included in this group not only diagnosed cases of tuberculosis but also suspicious cases and contacts. These individuals made a total of 134,515 visits. On the first day of the year there were carried forward 9,593 cases and during the year there were 24,991 new admissions and 18,925 readmissions. The number of clinic individuals has increased each year since 1928 when there were 38,852.

Of the 9,593 persons under observation of the district tuberculosis clinics

on January 1, 1932, there were 2,528 who had been diagnosed cases of tuberculosis, the remainder being suspicious and contacts. Among the 24,991 new persons admitted to clinics exactly 4,000 new cases of tuberculosis were found.

Educational and supervisory work has been carried on in homes through the nursing service. In 1932 there were made 41,743 nurses' visits in behalf of clinic cases and 83,727 for non-clinic cases, making a total of 125,470 nurses' visits for the sanitary control and home supervision of tuberculosis cases in New York City.—G. J. Drolet, *Consolidated Statement for New York Tuberculosis and Health Association*, June, 1933.

**East Orange, N. J.**—The Health Officer of this city has continued to make effective use of the *Appraisal Form* in evaluating his health service and in illustrating his annual report. This city in 1932 scored 912 points in a possible 1,000, and in all services with the exception of cancer control and heart disease control the score exceeded 75 per cent. Perfect scores were recorded for vital statistics, infant hygiene, and sanitation.

With a population of 71,827 the death rate was 9.3. There were reported but 4 cases of diphtheria with no deaths and only 4 cases of typhoid fever with but 1 death. The low diphtheria incidence is ascribed to the fact that 46 per cent of the preschool children are now protected against this disease. In the case of the typhoid fever cases no common source of infection was discovered. Two of the cases had recently traveled extensively and the

other 2 were in the habit of taking many of their meals outside of the city.

Because of the prevalence of rabies there was adopted an ordinance that requires all dogs not confined at home to be either muzzled or kept on leash. The enforcement of this ordinance resulted in a decrease in the number of dog bites toward the latter part of the year. No case of human rabies developed although 18 persons bitten by infected dogs were given antirabic treatment.

East Orange was awarded first prize for 1932 for cities of from 50,000 to 100,000 population in the annual Health Contest of the United States Chamber of Commerce. This city also ranked first in her population group in 1929 and received third and second places, respectively, in 1930 and 1931.

**Typhoid Carriers in New York State**—The death rate from this disease has decreased from 19.7 in 1908 to 1.0 in 1931. The first typhoid carrier was officially reported in 1911 and since that time 368 chronic carriers have been discovered in upstate New York. Of this number 72 were found through the routine examination of release cultures; 277 were discovered by epidemiological investigation of outbreaks. Only 4 carriers were reported as a result of routine foodhandler examinations. The value of the surgical removal of the gall bladder is discussed with the conclusion that this operation should not be ordinarily advised for the relief of the carrier condition for persons over 50 years of age.—*Health News*, New York State Dept. of Health, 10, 153 (Sept. 25), 1933.

**Duties of Health Commissioners**—Under the direction of a special committee of the Ohio State University a detailed study has been made of the duties of public health commissioners in Ohio. This work has been undertaken to secure a definite basis for selecting

the content of courses for health commissioners. The duties of the health officers have been analyzed with a view of conducting a short course for commissioners who are already in service. Ohio possesses 180 separate health districts, 92 of which are city units and 88 general county health districts. This district organization was provided for by an act of the legislature passed in 1920 when more than 2,000 independent city, village, and township health units were abolished.

It is recommended that the short course should be 12 weeks in length and divided into two 6-week periods. Based upon a study of the official duties of the administrator the following units of instruction have been chosen: (1) laboratory and engineering technic, (2) vital statistics and records, (3) diagnosis of communicable diseases, (4) public health administration, (5) health education, (6) personal relations.—W. W. Charters and Darwin A. Hindman, *Educational Monographs, Ohio State University Studies*, No. 17, 1933.

**Hamilton, Ont.**—When Dr. James Roberts was appointed Medical Officer of Health of Hamilton in 1905 the city was spending about \$.30 per capita for public health work, most of which was expended for garbage collection. In 1932 the per capita expenditure of the Health Department had increased to \$.87, and with the addition of the health activities of the Board of Education and the Babies' Dispensary Guild the per capita expenditure was approximately 1.17 exclusive of hospital maintenance.

During this period of time the death rate has decreased so that instead of 2,200 persons dying in 1932 there were but 1,400 deaths, an annual saving of 800 lives. The infant death rate has decreased from 158 to 57.7; the tuberculosis death rate from 121 to 42.3. A most striking example of the control of a preventable disease is the reduction in

the diphtheria and typhoid fever death rates. From a rate of 35 per 100,000 in 1905 diphtheria has been reduced until not a single death has occurred during the past 3 years. The typhoid fever rate has likewise dropped from 35 until the disease is now practically nonexistent.

Cambridge, Mass.—For 1932 Cambridge reports a general death rate of 12.09 per 1,000, slightly higher than the 11.93 rate for 1931. However, the correct Cambridge resident death rate which includes residents of this city

who died outside of Cambridge was 11.3. The infant mortality rate was 56 per 1,000 live babies. Heart disease was the major cause of death followed by cancer. Pneumonia appeared in fourth place and pulmonary tuberculosis in sixth place.

Sixty-nine cases of diphtheria were reported during the year with 4 deaths. One-third of the reported cases and one-half of the deaths occurred in East Cambridge which has only 15 per cent of the population of the entire city. None of the children affected had been immunized.

## LABORATORY

### PRESERVATION OF MILK SAMPLES WITH BRILLIANT GREEN FOR STREPTOCOCCUS AND ABORTUS EXAMINATION\*

C. S. BRYAN

*Section of Bacteriology, Agricultural Experiment Station, East Lansing, Mich.*

THE ever increasing demand for examination of milk, for the presence of streptococci of mastitis and the abortion organism, presents an important problem to the laboratories concerned. The problem of obtaining suitable milk samples either through the mail or from inspectors is very important. The examination of improperly preserved samples has caused considerable inconvenience and has resulted, in a great many instances, in a reduced quality of market milk.

This reduction in quality is due largely to the subsequent lack of detection of abnormal milk. The milk produced by mastitis infected cows is frequently and intermittently abnormal in flavor and odor to a sufficient degree to impart such abnormality to all milk

with which it later comes in contact. It, therefore, is essential to detect cases of mastitis in the various herds, and thus a cheap and efficient agent for preservation of milk samples for examination becomes essential. Undulant fever infection, in humans, that results from the ingestion of raw abortus infected milk presents another important problem. Such milk that is to be examined must be properly preserved. An agent is herein presented for preservation of milk which is to be examined for either or both streptococci of mastitis and the abortion organisms. This preservative is cheap, efficient, and easily applied.

#### RESULTS AND DISCUSSION

A number of dyes were compared to determine their preserving action in milk. It was desired not only to have

\* Journal article No. 163 (n. s.) from the Michigan Agricultural Experiment Station.

an agent for preservation of streptococcus infected milk and another for abortus infected milk, but to find one that could be used in the same manner for both tests. The length of time during which a preservative is effective is also important; for this reason 20 days was the time covered in this experiment, since it was felt that this would be sufficient time for a sample to be shipped through the mail to a laboratory for examination.

If milk is held at room temperature without a preservative, souring takes place within 48 hours. This is caused by those bacteria that are found in the udder and also those that get into the sample during its collection; the dye inhibits these bacteria from growing. Thus upon cultural examination the infective organisms can readily be isolated and are not hindered by other bacteria that would grow upon culturing an unpreserved sample. The accuracy of the laboratory tests for detection of mastitis depends upon the condition of the sample submitted. The results of such tests are altered upon the growth of some types of bacteria. If curd formation has taken place a uniformly mixed sample cannot be obtained; thus the results would be very inaccurate. Torrey<sup>1</sup> has demonstrated that sour milk will give an unreliable result to the agglutination test for abortus infection of the udder. Thus the need for a preservative agent is readily conceded where refrigeration is inconvenient or impossible.

Of the dyes under study, brilliant green was found to be most suitable as a preservative agent of milk for the problem involved. Brilliant green (1 per cent aqueous solution) was added to the milk at the rate of 0.1 c.c. per 10 c.c. of milk; this made a final dilution of 1:10,000 of the dye in the milk. Gentian-violet in the same proportions can be substituted for the brilliant green. This, however, is not so satis-

factory if the preserved sample is to be titrated for chlorides, due to a masking of the endpoint of titration.

The ability of the dye to preserve the milk is attributed to the bacteriostatic activity which it exhibits. Thus it can readily be seen that care must be exercised at the time of collection of the milk samples, in order that other types of bacteria may not gain entrance. A sterile container is also essential.

The only precautions necessary in the collection of milk samples are: (1) Wipe the udder of the cow, using a cloth moistened with an antiseptic; (2) discard a few streams of milk from each quarter; and (3) milk directly into the container. The preservative may be added prior to collection of the sample, in which case the milk must be added later. In either case a final dilution of 1:10,000 of dye in the milk is essential.

Such preserved milk can be sent through the mail as the samples may be held at room temperature without any changes taking place to alter the results of the usual laboratory tests for detection of mastitis or abortion infection of the udder. The following are the laboratory tests used in mastitis detection: (1) Cultural; (2) leucocytes per c.c.; (3) per cent of chlorides; and (4) catalase. For detection of abortus infection of the udder the agglutination and cultural examination were used. The preservative does not affect any of the above determinations except the titration for the amount of chlorides. Here it causes a change in the color of the endpoint of titration, but does not affect the technic involved. When the preserved milk is diluted with water and potassium dichromate is added the solution is a yellowish green color; the endpoint of titration with silver nitrate is the first shade of a brown color.

Table I presents the results of using brilliant green to preserve naturally streptococcus infected milk. In the



TABLE I

NATURALLY STREPTOCOCCUS INFECTED MILK PRESERVED WITH BRILLIANT GREEN AND HELD  
AT ROOM TEMPERATURE

Date 1933	Per Cent Chlorides	Cells per c.c.	Catalase c.c. of Gas*	Streptococci per c.c.
<i>Sample A</i>				
5/10	0.30	16,960,000	7.5	4,200,000 (without preservative)
5/10	0.30	16,900,000	7.5	4,200,000
5/11	0.29	16,700,000	7.45	4,200,000
5/20	0.29	16,600,000	7.5	4,200,000
5/30	0.28	16,400,000	7.4	4,200,000
<i>Sample B</i>				
5/10	0.25	3,700,000	6.8	3,000,000 (without preservative)
5/10	0.25	3,920,000	6.8	3,000,000
5/11	0.26	3,800,000	6.6	3,000,000
5/20	0.25	3,500,000	6.8	3,000,000
5/30	0.24	3,450,000	6.7	3,000,000
<i>Sample C</i>				
5/10	0.26	5,400,000	7.3	10,000,000 (without preservative)
5/10	0.26	5,500,000	7.2	10,000,000
5/11	0.26	5,200,000	7.1	10,000,000
5/20	0.24	5,000,000	7.0	9,840,000
5/30	0.24	5,000,000	6.9	9,900,000
<i>Sample D</i>				
5/10	0.31	11,660,000	7.0	6,210,000 (without preservative)
5/10	0.31	11,500,000	7.0	6,100,000
5/11	0.32	11,700,000	6.8	6,200,000
5/20	0.30	11,000,000	6.8	6,000,000
5/30	0.31	11,120,000	6.75	6,120,000
<i>Sample E</i>				
5/10	0.29	5,000,000	5.0	1,600,000 (without preservative)
5/10	0.29	5,200,000	5.0	1,600,000
5/11	0.28	4,800,000	5.0	1,480,000
5/20	0.29	5,300,000	5.0	1,500,000
5/30	0.28	5,100,000	4.9	1,440,000
<i>Sample F</i>				
5/10	0.27	53,000	4.9	2,200,000 (without preservative)
5/10	0.27	57,000	5.0	2,310,000
5/11	0.28	60,000	4.9	2,200,000
5/20	0.26	50,000	4.7	2,200,000
5/30	0.26	53,000	4.7	2,400,000
<i>Sample G</i>				
5/10	0.14	20,000	0.5	— (without preservative)
5/10	0.14	20,800	0.5	—
5/11	0.13	20,100	small bubble	—
5/20	0.13	19,400	—	—
5/30	0.13	19,000	—	—

\* Catalase tube was used to determine amount of gas.

case of each sample an initial set of determinations was made before preservative was added. Immediately upon the addition of brilliant green another

set of determinations was made. No significant variation was found in the results obtained. A non-infected sample was also included in this study; the results clearly indicate that the preservative did not alter the reactions to the various tests.

The time involved in this study was sufficient for milk samples to reach any laboratory. As the time previous to examination runs over 20 days all the values, in the various tests, begin to drop except in the cultural examination. Here samples have been preserved without change for 3 months.

It is not only desirable to have a specific agent for preservation of milk samples that are to be examined for abortus infection of the udder, but to have an agent that can be used for both or where both examinations can be made on the same sample. Table II presents the data using brilliant green as a preservative for milk samples to be examined for abortus infection of the

udder. As before, an initial run was made without dye, followed immediately and at intervals with determinations on the preserved samples. Again it is noted that the results are constant during storage. The preservative did not alter the reaction of the noninfected sample.

The uniformity of the results obtained, during storage at room temperature, are definite evidence of the value of brilliant-green dye as a preservative for milk samples that are to be examined for streptococci of mastitis or the abortus organisms. The small amount of dye necessary makes it a very economical agent. Its ease of application is ideal; thus the dye may be placed in the container at the laboratory to which a certain volume of milk must be added at the time of collection of milk sample, or milk can be collected into a sterile container and the dye then added in sufficient amounts to make a final dilution of 1:10,000 of dye in the milk. This method of preserving milk samples enroute to the laboratory for examination has been employed for the past few years in our routine work.

TABLE II

NATURALLY INFECTED ABORTUS MILK PRESERVED WITH BRILLIANT GREEN (1:10,000 FINAL DILUTION) AND HELD AT ROOM TEMPERATURE

		Agglutination on		Serum	
Date	Culture				
<i>Sample A</i>					
5/10	+	++++	P-	(without preservative)	
5/10	+	++++	P-		
5/11	+	++++	P-		
5/20	+	++++	P-		
<i>Sample B</i>					
5/10	+	+++++	P	(without preservative)	
5/10	+	+++++	P		
5/11	+	+++++	P		
5/20	+	+++++	P		
<i>Sample C</i>					
5/10	-	-----		(without preservative)	
5/10	-	-----			
5/11	-	T-----			
5/20	-	-----			

## CONCLUSIONS

An efficient, convenient, and economical agent is herein suggested for preserving milk samples that are to be examined for either mastitis or abortus infection of the udder. Brilliant green in final dilution of 1:10,000 in the milk is sufficient to preserve milk samples without change, for at least 20 days, in so far as the various tests are concerned. Gentian-violet in the same concentration can be substituted for the brilliant green.

## REFERENCE

1. Torrey, J. P. The Diagnosis of *Brucella* Abortus Infection in the Udder of the Cow. *A.J.P.H.* 19, 12:1360 (Dec.), 1929.

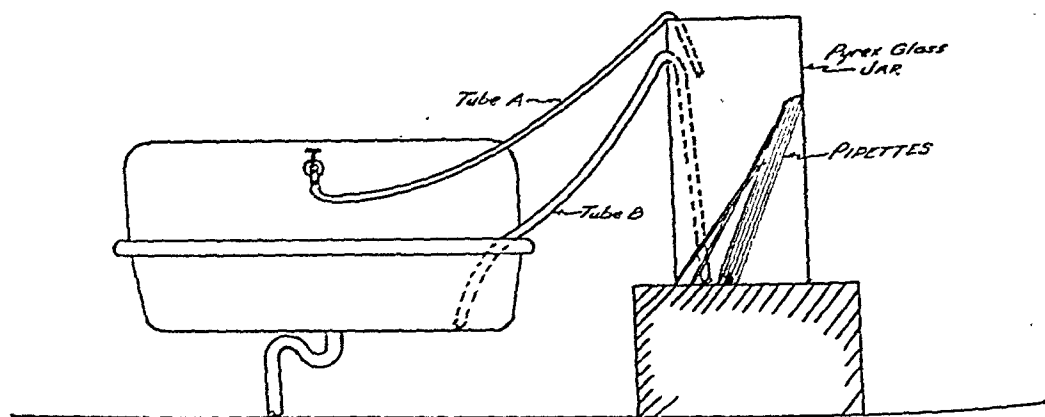
## AUTOMATIC PIPETTE WASHER

ELLEN HOWELL AND FANNIE MAE FRANK

*Alabama State Board of Health Laboratories, Montgomery, Ala.*

ANY laboratory using as many as 100 pipettes a day would find the described washer of great convenience. The jar is filled and emptied every 7 minutes and in an hour over 100 pipettes are washed more thoroughly and more rapidly than if washed by hand or by a suction tube. The jar is of Pyrex glass,  $17\frac{1}{2}$ " x  $8\frac{3}{8}$ " in diameter, and easily stands drilling without breakage by any glass company cutting automobile glass. The

inlet tube A is 6 mm. inside diameter and the outlet tube B is 14 mm. inside diameter. When the flow of water reaches the hole carrying the outlet tube and bored 2" from the top of the jar, the siphon breaks and the jar automatically empties, and as the level of the water descends in the jar the water in the pipettes drains. After using the washer for a few days the general appearance of the pipettes is greatly improved.



## VITAL STATISTICS

Mortality Statistics in the Death Registration Area of Continental United States: 1930, 1931 and 1932 —The Bureau of the Census at Washington, D. C., in a release of September 28, 1933, announced that in 1932 in the death registration area of continental United States (exclusive of the State of Utah) there were 1,304,109 deaths from all causes, representing a mortality rate of 10.9 per 1,000 estimated population. This is the lowest

rate since the annual collection of mortality statistics was begun in 1900. It is estimated that 96.3 per cent of the total population of the United States was included in the registration area for the year 1932. Because of the failure of the State of Utah to furnish the Bureau with death certificates for the year 1932, no data for that state are included in the summary. However, even if the number of deaths which occurred in Utah were included, the

total death rate for each of the 3 years would remain practically unchanged.

It is gratifying to note that of the 18 groups of causes of death into which the summary is divided, 13 showed decreases in the total number of deaths, while only 3 groups had increases, and 2 remained practically the same. The groups which show decreases include infectious and parasitic diseases, chronic poisonings and intoxications, diseases of the nervous system, of the respiratory system, of the digestive system, and of pregnancy, childbirth and the puerperal state. Of particular interest is the decrease in the death rates (per 100,000 population) in certain causes of death such as typhoid fever (which showed rates of 3.6 in 1932, and 4.4 in 1931), measles (1.6 in 1932, 3.0 in 1931), diphtheria (4.5 in 1932, 4.8 in 1931), tuberculosis, all forms (63.0 in 1932, 68.4 in 1931), diarrhea and enteritis under 2 years of age (12.0 in 1932, 15.7 in 1931) and some others. The large decrease of over 9,000 deaths from tuberculosis (all forms), and the drop in the death rate from 71.7 in 1930 to 63.0 in 1932 is most noteworthy. The smaller number of deaths from diseases of the respiratory system (105,555 in 1932 and 110,617 in 1931) may be accounted for largely by the decrease in both bronchopneumonia, including capillary bronchitis (which showed 39,015 deaths in 1932 and 39,977 in 1931) and lobar pneumonia (49,376 in 1932 and 52,950 in 1931). Influenza showed a decided increase (with 36,818 deaths in 1932, and 31,596 in 1931), though the rate of increase for 1932 over 1931 was much less than from 1930 to 1931. The decrease in diseases of pregnancy, childbirth, and the puerperal state (which accounted for 13,241 deaths in 1932 and 14,188 in 1931), was approximately the same from 1931 to 1932, as from 1930 to 1931, and is due in a large measure to the smaller number of deaths from puerperal albu-

minuria and eclampsia and puerperal septicemia.

The smaller number of violent and accidental deaths, (117,370 in 1932 and 124,543 in 1931) is due, principally, to the decreased number of deaths from motor vehicle accidents. The number of suicides increased for the 3-year period, from 18,496 in 1930, to 20,880 in 1932, and the number of homicides was more for 1932 (11,016) than for 1930 (10,590), though less than in the year 1931 (11,134).

The outstanding groups in which large increases were shown were cancer and other malignant tumors and diseases of the circulatory system. The number of deaths due to cancer and other malignant tumors (114,873 in 1930, 117,790 in 1931 and 122,339 in 1932) continues to increase from year to year, and practically every title to which deaths due to this cause are allocated shows an increase in number, if not in actual rates. Of the total number of deaths assigned to this title, 25,802 were of the stomach and duodenum, 14,871 of the uterus, 11,863 of the breast, and 10,420 of the liver and biliary passages.

Deaths due to diseases of the circulatory system increased numerically from 280,403 in 1930 to 294,596 in 1932, equivalent to death rates of 237.5 and 246.2, respectively. This large increase was due, principally, to diseases of the myocardium and of the coronary arteries, angina pectoris; chronic endocarditis, valvular diseases, being the only cause in this group for which there was a considerable decrease in 1932 from 1930.—U. S. Department of Commerce, Bureau of the Census. Sept. 28, 1933.

**The Incidence of Endemic Goiter in Northeastern Germany—Analysis of records of physical examination of applicants for immigration visas by residents of the five consular districts**

of Berlin, Leipzig, Dresden, Breslau, and East Prussia, brings to light some interesting facts on the incidence of endemic goiter in Northeastern Germany.

The ages of those examined ranged between 3 weeks and 91 years. Thus, 36 males and 53 females were under 5 years, while 83 males and 198 females were over 50 years of age. Larger numbers were included in the intermediate age groups.

The tabulation of results indicates that there were 326 definite thyroid enlargements among the 1,976 males, a percentage incidence of 16.5. Of the thyroid enlargements found, 61.3 per cent, while definite in character, were classified as very slight in size. Only 8 adenomatous goiters were found among the males. Among the 2,320 females there were 727 thyroid enlargements, a percentage of 31.3. Of these, 46.6 per cent were classified as very slight, while 9.4 per cent were definitely adenomatous in character.

In the three lower age groups, namely, from birth to 14 years, approximately the same incidence of thyroid enlargement appeared to prevail in both sexes. However, it is probable that the inclusion of greater numbers of children would have altered the result, making the affection somewhat more frequent among girls. The approximation of the incidence curves of both sexes indicates a considerable amount of endemic goiter in the general population. After 15 the incidence of thyroid enlargement is consistently greater among the females of each age group.

The statistical data show that among boys, the incidence of endemic goiter is greatest between the ages of 10 and 14 years. Among females the incidence of goiter is highest between ages 15 and 24 years. After age 24, the goiter incidence among females is between 10 and 22 per cent higher than among males of corresponding ages.

During the examinations in Berlin, 3 females and 1 male were found to be suffering from Graves' disease. In three additional instances thyroidectomies had been performed at varying periods prior to the examinations without, however, relieving the symptoms of the disease. While the number of persons in the present series who were actually suffering from Graves' disease was relatively small, it is believed that the disease is comparatively frequent in Germany for frank cases are often seen in public.

Additional observations were made for the purpose of determining whether a relationship exists between intelligence and thyroid status. Although many intelligence tests were applied and a number of mentally defective individuals were encountered, there was no evidence that thyroid enlargement or malfunction is commonly associated with mental inferiority.

The results of a survey (similar to that in Northeastern Germany) made of applicants for immigration visas in Northern Ireland revealed a percentage incidence of endemic goiter of 11.8 among males, and 27.4 among females for that territory. Further analysis shows the incidence of endemic goiter in Northern Ireland to be definitely lower in both sexes and for practically every age period than in Northeastern Germany. Just why this should be so is a matter for speculation, as considerable areas of both countries are adjacent to the sea, and it might be expected that goiter would be relatively infrequent in its occurrence.

As shown by the results of the thyroid survey of persons of all ages endemic goiter prevails to a considerable extent in Northeastern Germany, especially among girls and women. Nearly 3 per cent of the females examined had goiters of adenomatous character. Evidences of toxicity were noted in 14.7 per cent of these.

In view of the considerable incidence of endemic goiter and the presence of toxic adenomata, especially among females, prophylactic endeavor appears to be indicated in this section of Germany. Some attention might likewise be directed to the prophylaxis of Graves' disease, which affection is also encountered.—*Pub. Health Rep.* 48:1074-81 (Sept. 1), 1933.

**Infant Mortality in Pennsylvania in 1932**—There were 10,103 deaths under 1 year of age in Pennsylvania in 1932. This total as well as the rate of 60 per 1,000 live births established a record low mark in infant mortality. A 15.1 per cent decrease from 1931 was recorded in the infant deaths last year, and a 46.5 per cent reduction was registered from 1922. In 1906, the first year of registration in this state, 1 in every 4 deaths was an infant death, while in 1932 the ratio was 1 in approximately every 11 deaths. During the past 3 years the highest infant mortality rate occurred twice in March and once in December, and the lowest in June and July. The excessive rates in the winter months are due to the incidence of respiratory diseases in that season, and the high rates in the late summer and fall are caused by the prevalence then of the gastrointestinal disorders.

Of the 10,103 infant deaths recorded last year, 5,593 or 55.4 per cent were of infants under 1 month, and, of these, over a third were less than 1 day old.

The five leading causes of infant mortality in 1932 were: premature birth with a death rate per 1,000 live births of 16.0, pneumonia 9.9, congenital malformations 6.8, diarrhea and enteritis 6.1, and injury at birth 4.3. Comparison of these rates with those for 1906 shows that the greatest reductions in infant mortality have taken place in the gastroenteric and respiratory diseases. In 1906, diarrhea and enteritis

was the leading one of these five causes of infant mortality, with a death rate of 47.7 per 1,000 live births; pneumonia followed with a rate of 18.6; then came premature birth 16.7, congenital malformations 9.0, and injury at birth 3.4. It may be noted with considerable concern that the death rate from premature birth has shown very little improvement and that the death rate from injury at birth has increased instead of decreased, during this period of 26 years.—*Vital Stat. Bull.*, Pennsylvania State Dept. of Health, Sept., 1933. pp. 5-6.

**Marriage and Divorce in Wisconsin in 1932**—With the single exception of 1918 there were fewer marriages in Wisconsin during 1932 than for any year since 1887 when the first statistics on marriage were compiled. For 1918 the state recorded only 11,890 marriages and only 14,050 marriages in 1932. Since 1920 when 22,293 marriages were recorded, the marriage rate has steadily declined. The present low rate cannot, then, be attributed wholly to the depression. During the very prosperous years from 1922 to 1929 marriages were declining steadily each year due, in part, it is believed, to marked changes in the economic status of women and the apparent lack of interest in home making on the part of both sexes.

The number of divorces granted and marriages annulled in 1932, as compared with 1931, decreased nearly 300 and is the smallest number reported since 1924. This can probably be charged directly to the depression and the inability to obtain funds to pay for the divorce action. There seems to be no evidence of increased regard for the sanctity of the marriage contract nor any better appreciation of the divorce evil and what it means to civilization. The facts are that many sincere, socially-minded persons, particularly

some prominent sociologists, are now advocating a plan to make marriage more difficult and divorce less difficult. It is granted that the prevention of hasty marriages, if made nation-wide, will reduce the number of divorces even if the divorce laws are not changed. The crying need is for uniformity in both marriage and divorce laws.

Several attempts to liberalize the Wisconsin marriage laws at the 1933 session of the legislature so as to make them conform with the "easy marriage" laws of neighboring states were defeated, making it reasonably certain that there will be no changes in the marriage laws for at least 2 years. If Illinois and Iowa would require a 5-day waiting period after the application for a license is filed, there would be very little demand for amending the Wisconsin laws.

In 1932 with a total of 2,404 divorces and annulments recorded, the husband was the complainant in 452 cases and the wife was the plaintiff in 1,952 cases, while for 1931 the husband was the plaintiff in 553 cases and the wife in 2,149 cases. Over a series of years the wife brings the action and is granted the divorce in about four cases to one for the husband.

The chief causes for divorce as stated in the court action during 1932 were: cruelty in 1,622 cases, desertion in 395 cases, nonsupport in 189, drunkenness in 42, and adultery in 28.

The divorce rate per 10,000 population in 1932 was highest in Lafayette county with a rate of 18. The follow-

ing counties also had comparatively high rates: Dane 13.8, Douglas 13.7, Florence 13.1, Juneau 13, Oneida 15.3, Rock 15.8, Washington 14.9, Waukesha 13.6 and Wood 13. The divorce rate was low in the following counties: Burnett 2.9, Calumet 2.4, Dunn 2.2, Iowa 2.5, Kewaunee 1.9, Marquette 2.2, Oconto 2.7, Pepin 2.7, Taylor 2.8, Trempealeau 2.1, Vernon 2.8, and Washburn 2.7. The divorce rate for the entire state in 1932 was 8 for each 10,000 population or nearly 1 divorce for each 6 marriages solemnized during that year.

Fifty per cent of the divorces in Wisconsin last year were for couples not married in this state. For many of the counties bordering on the states with comparatively lax marriage laws, more than 70 per cent of the divorces were for people married out of the state but having a legal residence in Wisconsin. In some of these counties with a high percentage of out-of-state marriages, investigations show that as many as 85 per cent of the marriages lasting less than 5 years were among persons married in adjoining states. Classifying the 1932 divorces according to the duration of marriage, the report shows that 60 per cent of the divorces were granted before 10 years of married life; of these, the greatest number occurred among persons who had been married for from 5 to 9 years. There is no material change in the duration of marriage now as compared with twenty years ago.—Wisconsin State Board of Health *Bull.* 5:15-17 (July-Sept.), 1933.

# INDUSTRIAL HYGIENE

**The Pathologic Reactions in Various Pneumoconioses**—The present knowledge regarding types of pneumoconiosis is limited by insufficient autopsy material. The diseases caused by pure chemical substances, however, are predominantly either linear (caused by inhalation of inert foreign matter), nodular (apparently confined to silicosis), and diffuse (as in asbestosis cases) in character. Reaction to dusts may be divided into 5 general phases: (1) early diffuse parenchymatous disease due to accumulation of phagocytes and local inflammatory changes in the adjacent connective tissues, (2) linear peri-lymphatic proliferation, (3) beading of the trunk due to chronic proliferative changes in associated lymphoid tissues, (4) enlargement of the mediastinal lymph nodes due to proliferation of the local connective tissues, and (5) late chronic proliferation and nodule formation in the finer connective tissues of pulmonary parenchyma. The different phases are accentuated by the various types of pure dust. Silica produces all the above mentioned reactions.

Animal experimentations indicate that a high atmospheric concentration (200 million particles per cu. ft. of air) of exceedingly fine particles of silica can develop acute silicosis within a period of from 12 to 18 months, with an exposure of 8 hours per day.

Several examples of the pathologic changes due to inhalation of mixed dusts such as coal and silica, and granite dusts are given the characteristic reaction of non-siliceous dusts in a peri-lymphatic cellular connective tissue formation. When tuberculosis infection sets in nodular lesions resembling typi-

cal silicosis were formed without stint throughout all portions of the lung.

Experimental studies with guinea pigs showed that exposures to heavy concentrations of granite dust for a period of 7 months would not produce nodular fibrosis but that exposure to pure quartz dust did develop lesions. In still other experiments it was shown that 74 per cent of the animals inhaling pure silica reactivated their partially healed primary tuberculous infection while with granite dust only 26 per cent developed progressive infection.

These studies, together with the Barre experiences, indicate that only the free silica content of granite dust is of significance in the production of the disease and that the other constituents act as inert diluents. Granite pneumoconiosis, develops much more slowly than that produced by pure silica. It is also possible that the non-siliceous content of the dust may cause a biologic reaction to modify the characteristic effects of pure silica.—Leroy U. Gardner, *J.A.M.A.* 101, 8:594-598 (Aug. 19), 1933. L. G.

**Etiology of Silicosis**—The primary cause of silicosis is free silica in the form of dust. The dust particles must be less than 10 microns in size to penetrate into the lungs. Silicosis is a disease which develops very slowly (2 to 10 years) and produces a condition of extraordinary susceptibility to tuberculosis. The rate of development of the disease is determined by the dust concentration of the inspired air, silica content of the dust and length of exposure. A few of the contributing causes to silicosis are: (1) preëxisting pulmonary disease other than silicosis,



(2) nasal obstruction or other conditions causing mouth breathing, and (3) conditions of lowered body resistance.

A world-wide distribution of silicosis as an occupational disease has been occasioned by the introduction of pneumatic tools for rock cutting and by sandblasting methods in foundries and potteries. Due to the difficulties encountered in diagnosing silicosis cases the necessity of reviewing the occupational history of the patient for silica exposure is emphasized.—A. J. Lanza, *J.A.M.A.* 101, 8:583-584 (Aug. 19), 1933. L. G.

**The Clinical Manifestations of Silicosis**—This is a study based upon the examination of 7,722 miners in the Picher District. There was a striking similarity of observations to those noted in the silicosis study in South Africa.

The three stages of silicosis are described and discussed. The cardinal symptom noted was shortness of breath, and the most characteristic sign was decreased chest expansion. In the first stage of silicosis the men usually appeared to be in robust health. No definite physical signs in the chest could be noted in most cases but there were certain constant clinical signs present. There were: (1) lack of elasticity of chest wall during respiration, (2) somewhat reduced vital capacity, and (3) a certain characteristic type of breath sound.

In the second stage of silicosis there is a definite shortness of breath on exertion. Pains in the chest are frequent complaints. An increase in coughing, expectoration, hemoptysis, night sweats, loss of strength and appetite were noted. The men in general, however, appeared to be in good health. The characteristic roentgenographical appearance is a generalized medium sized mottling throughout the lung fields.

In the third stage the shortness of breath is marked and distressing even on slight exertion. The individual's capacity for work becomes impaired. There is a greatly decreased chest expansion, loss of weight, increase in pulse rate, and a dilatation of the heart. Radiographs show a dense fibrosis present in the lungs.

There were only 32 third-stage silicosis cases found. Among the 7,722 men examined 267 cases showed silicosis complicated by clinically active tuberculosis.—R. R. Sayers. *J.A.M.A.* 101, 8:580-583 (Aug. 19), 1933. L. G.

**Fundamentals of Asphyxia**—The stages of asphyxia are: (1) deficiency of oxygen, (2) deficiency of carbon dioxide, and (3) a series of stages leading to autolysis, fatty degeneration and necrosis. For the second stage in asphyxiation the author suggests a new term, "acardia," defined as the asphyxial diminution in the bicarbonates of the blood.

Chemical changes occur in the blood during asphyxiation, first an alkaline and then an acid shift. Under slight oxygen deficiency in the first state of asphyxiation the increased respiration over-ventilates the blood. The loss of carbonic acid then leaves blood relatively alkaline and a compensatory decrease of bicarbonates or acardia occurs.

The upsetting of the acid-base equilibrium of the blood, as by asphyxiation, has been recognized as a condition known as "acidosis." This condition, however, does not indicate the balance of acid and alkali in the body, as is the popular opinion, but is an index of the state of the respiratory center.

Experimental evidences with dogs have shown that asphyxiation is not a condition of acid intoxication or "acidosis." In a progressively diminishing supply of oxygen a compensatory

acardia develops with the diminishing carbon dioxide content of the blood (due to over-breathing), and no increase in lactic acid in the blood was noted until the oxygen had fallen to the asphyxial level and the animal was approaching death.

Carbon dioxide in varying concentrations (7 per cent mixture of carbon dioxide with oxygen for resuscitation cases, and a mixture of 20–30 per cent of carbon dioxide in oxygen, or even pure carbon dioxide in cases of deep post-anesthetic depression) has been administered with great success. Carbon dioxide not only stimulates respiration but hastens recovery of normal conditions. It does not "intensify the acidosis" as one might believe in considering the acid-base equilibrium of the blood from the standpoint of physical chemistry.—Yandell Henderson, *J.A.M.A.* 101, 4:261–266 (July 22), 1933. L. G.

#### Occupational Anthrax Reported in Germany—

	1931		1932	
	Total No.	Fatal	Total No.	Fatal
Agriculture	87	5	63	6
Hides and Skins	19	4	7	..
Hair	8	2	6	..
Various	4	..	6	3
	118	11	82	9

*Indust. & Lab. Inf.*, LXVI, 11:327, and 12:402 (June 12 and 19), 1933.

E. R. H.

**Silicon Dioxide Content of Lungs in Health and Disease**—The presence of silicon dioxide was first chemically demonstrated in the lungs of a razor grinder in 1865. Since that time varying concentrations (from 3 to 56 per cent depending upon concentration and length of exposure to silicon dust) of silicon dioxide have been reported in the ashes of normal and diseased lungs. The

analyses of the lungs of six gold mine workers in South Africa showed from 9 to 21.7 gm. of ash per lung of which from 29 to 48 per cent was silica while a normal lung contained 0.73 per cent. Since silica is, next to oxygen, the most common element of the earth's crust it is not very surprising to find silica in the normal lung. Silica is a normal constituent of the connective tissue, skin, blood, bones, nails, urine, feces, and saliva of man.

Analyses were made on 21 lung specimens to determine the average silicon dioxide content of lungs. The normal lung was found to contain about 1.13 mg. of silicon dioxide per gm. of dried tissue. Any lung containing over 2 mg. of silicon dioxide per gm. of dried lung indicates undue exposure to a dusty atmosphere. The silicon content of lungs of 8 persons working in dusty atmospheres varied from 2.4 mg. (machinist) to 26.0 mg. (granite cutter) of silicon dioxide per gm. of dried tissue.

A chemical examination of the lungs for silicon dioxide is suggested in cases coming to autopsy as an aid to a correct diagnosis of silicosis.—William D. McNally, *J.A.M.A.*, 101, 8:584–587 (Aug. 19), 1933. L. G.

**Roentgenologic Aspects of Pneumoconiosis and Its Differential Diagnosis**—The definition of pneumoconiosis and its most frequent form of silicosis in any simple term is inadequate in the light of recent pathologic and histologic studies and added clinical experience. It is admitted, however, that any comprehensive definition of silicosis or even of pneumoconiosis in general would be too complex for practical use. The proper diagnosis of pneumoconiosis, therefore, becomes a difficult one as well as of extreme importance in a medico-legal problem.

This paper describes and discusses

the differential diagnosis of pneumoconiosis by studying the pathologic phases or stages by means of the roentgenogram. The following conditions simulating pneumoconiosis are described: (1) the perivascular, peribronchial-lymph node phase, (2) passive congestion of the lungs as a result of cardiac decompensation, (3) passive congestion associated with coronary thrombosis, (4) advanced bilateral bronchiectasis, (5) asthma, (6) infiltrating or permeating malignant metastases, (7) polycythemia or erythemia, (8) mycotic infections, (9) nodular metastatic malignant conditions of the lung, (10) actinomycosis, (11) sporotrichosis, and (12) leptothrix infection.

The association of primary bronchogenic carcinoma in connection with pneumoconiosis is discussed with a review of 3 case histories. The predisposition of the Schneeberg and Joachimstal miners to bronchogenic carcinoma is discussed, but the authors

feel that radium emanation and arsenic are the probably etiologic factors instead of pneumoconiosis. Further statistical data are necessary before positive proof of the causative factor can be determined.—Henry K. Pancoast and Eugene P. Pendergrass, *J.A.M.A.* 101, 8:587-591 (Aug. 19), 1933.

L. G.

**The Radiologic Recognition of Heart Disease in Pneumoconiosis—** This article with 4 case reports and accompanying chest roentgenograms concludes as follows:

1. The roentgenologic sign of hypertrophy of the pulmonary artery and the right ventricle is described, and its importance emphasized.

2. Five cases, with their roentgenograms, are presented to demonstrate how this sign may be utilized to diagnose right ventricular hypertrophy due to pneumoconiosis. Electrocardiograms were made in 4 of these cases, each of which presented right axis deviation.—

John M. Dyson, *Am. J. Med. Sc.* 737: 165-169 (Aug.), 1933. E. R. H.

## FOOD AND NUTRITION

**Vitamin C Content of Strawberries and Strawberry Ice Cream**—Guinea pigs weighing between 280 and 325 gm. were used as experimental animals. Two lots of strawberries were fed—Klondike and Howard Supreme. The fruit was fed as follows: 2 and 4 gm. of fresh Howard Supreme strawberries; 2 and 4 gm. of fresh Klondike strawberries; 3 and 6 gm. of frozen strawberries with sugar; 2 parts berries to 1 of sugar; 10 and 15 gm. of strawberry ice cream, containing 30 per cent frozen-pack berries as above; and 2 and 3 gm. frozen strawberries, no added sugar. The lowest quantity (2 gm.)

fed fully protected from scurvy and produced large weight gains.

Apparently, there was no loss in the freezing and storing processes either with or without sugar. When frozen strawberries were used in strawberry ice cream, they retained their original antiscorbutic potency.

Decreased gains in weight were noted when the fruit was fed in the large doses. This effect has been noted in other vitamin C assays and the authors suggest it may be due to the disturbing effect on the digestive and nervous systems and to the unbalancing of the diet. In spite of poor or negative

weight gains, no scurvy was found on autopsy in any of the animals.—C. R. Fellers and M. J. Mack, *J. Indust. & Eng. Chem.* 25:1051 (Sept.), 1933.

**Studies on the Rôle of Zinc in Nutrition**—The difficulty of devising diets zinc free or containing only negative amounts of this element has resulted in a lack of conclusive evidence as to the rôle which zinc plays in animal nutrition in spite of its recognized occurrence and biological effect on plants.

Spectrographic examination of the ash of all the foods was employed. A rough approximation as to the content of zinc was undertaken by spectrography, supplemented by the turbidimetric method for quantitative determination. By comparison of both of these tests and painstaking treatment of the rations, the authors were able to secure diets in which the zinc content was less than 1 p.p.m.

Scrupulous care was taken to avoid contamination from the cages and other sources and a list is given of the zinc-free diets. A number of variations in the diets were employed both with zinc-free ration and those to which definite amounts of zinc had been added.

Since growth of the experimental animals took place on diets in which the zinc was present in approximately 1 part in 10 million, it is concluded that zinc is probably not essential as a nutritional factor in the case of the rat. Natural reproduction was more successful in these experimental rats although conception and gestation took place in the case of the parents on a zinc-free diet. Their young had greatly diminished compared to litters from the stock diet.

Analysis of the bodies of the rats showed that the zinc content of the stock rats and others on zinc-containing rations was roughly the same, while rats on the zinc-free diet lost both in pro-

portion and in actual amounts of zinc in the body.—John M. Newell and E. V. McCollum, *J. Nutrition*, 6:289 (May), 1933.

**Vitamin Studies VI. Influence of Fertilizers on the Vitamin C Content of Spinach**—After extensive investigation of the development of scurvy in guinea pigs, the authors reached certain conclusions regarding the effect of fertilization, as well as lime content of soil, on the vitamin C content of spinach.

When the soil is limed to the neutral point without the addition of fertilizers, spinach has a correspondingly low vitamin content, with balanced fertilization the highest. If any of the ingredients of the fertilizer, potash, phosphoric acid or nitrogen is in excess, in every case the result is a lessening of the vitamin content. Excess of phosphoric acid has the smallest influence, excess nitrogen the greatest.

It will be seen what a significance these findings have on the cultivation of these vegetables for the diet as well as those designed for canning. The cultivation of spinach takes place under world-wide conditions which vary, so that the vitamin C content not alone corresponds to the liming and fertilization of the soil but is affected by secondary influences of the soil which affect the nutritional balance in the plant. Only the cultivation of experimental plants under absolute conditions would guard against deceptive conclusions as to the establishment of the vitamin content.—F. V. Hahn and J. Görbing, *Ztschr. f. Unter. der Lebens.* 6, 65:39 (June), 1933.

**Comparative Effect of Tomato and Orange Juices on Urinary Acidity**—Previous experiments (*J. Nutrition*, 5:103, 1932, and *J. Nutrition*, 5:519, 1932, abstract, this *Journal*,

22:1185, 1932) showed that grapes, figs and raisins exerted a marked effect on the urinary acidity. Because of their general use in the diet it was considered desirable to ascertain the effect of daily ingestion of similar amounts of tomato and orange juices.

The present experiments in which 3 normal young men were used, were of 12 days' duration. Each experiment was divided into two consecutive periods. For the first 5 days each person received only the basal ration. During the next 7 days each received, in addition, 1,000 c.c. of either tomato juice or orange juice. The basal diet was the same as that used in the previous experiments and the 1,000 c.c. portions of the juices were used in order that the results might be comparable with the previous studies in which 1,000 c.c. portions of grape juices were used.

With both the tomato and orange juices, there was a generally uniform increase of pH of the urine following their addition to the diet. This increase was such that the pH during the last 3 days of the experiment was from 0.95 to 1.3 pH units higher than that of the 4th or 5th day of the experiment. The tomato juice produced an average change of 1.2 pH units, while the orange juice caused a change of about 1.05 pH units.

Corresponding decreases in both the ammonia excreted and in the total acidity were noted. The average changes produced by the two juices were approximately the same. When either of these juices was added to the basal ration, an increase occurred in the organic acids excreted. The average oxidation of the organic acids of tomato juice was 90.7 per cent while that of orange juice was 93.8 per cent. There appeared to be a correlation between the alkalinity of the ash and the reaction of the urine. A more basic reaction was associated with the higher ratio of soluble alkalinity to insoluble alkalinity

of the ash. The tomato juice exhibited the higher ratio and produced a somewhat greater change in reaction.—L. G. Saywell and E. W. Lane, *J. Nutrition*, 6:263 (May), 1933.

**The Calcium Retention on a Diet Containing Leaf Lettuce**—Two healthy young women, weighing 52.3 and 50.2 kg., served as the subjects in this experiment. Before participating in the lettuce study they ate a quantity of lettuce which would be necessary to meet the calculated requirement for calcium equilibrium and which would represent a high percentage of the total calcium. During this time the subjects abstained from other vegetables and fruits, but ate similar amounts of food.

During the leaf lettuce experimental period they consumed 54 gm. protein, 83 gm. fat, and 263 gm. carbohydrate which yielded about 2,000 calories. During the pasteurized milk period, subject I consumed 53 gm. of protein, 81 gm. of fat, and 269 gm. of carbohydrate, while subject II consumed 53 gm. of protein, 83 gm. of fat, and 260 gm. of carbohydrate.

The diet for the study of the calcium retention of leaf lettuce consisted of the ordinary strain of Grand Rapids leaf lettuce, lean round beef, soda crackers, butterfat and sucrose. In the milk study the diet was the same except that pasteurized whole milk replaced the lettuce, and apples were added. Distilled water was used *ad lib.* for drinking.

The calcium from the lettuce furnished 93.0 per cent of the total calcium of the diet for one subject and 92.9 per cent of the total calcium for the other, while the calcium from the milk furnished 88.4 per cent for one subject and 88.3 per cent for the other. The calcium of the fresh green leafy lettuce was superior in its utilization to that of pasteurized whole milk. Calcium balances show a daily average as follows:

	<i>Lettuce Diet</i>	<i>Pasteurized Whole Milk Diet</i>
Subject I	0.138	0.015
Subject II	0.173	0.032

—Marguerite G. Mallon, L. Margaret Johnson, and Clara R. Darby, *J. Nutrition*, 6:303 (May), 1933.

### Vitamins C and A in Blueberries

—Two varieties of blueberries were employed—*Vaccinium corymbosum*, the high-bush cultivated type, and the *V. pennsylvanicum*, the low-bush or dwarf type. Scurvy score was determined after the end of each feeding period by chloroforming the animals and examining for lesions. The negative controls died in from 26 to 33 days with an average scurvy score of 16. Two seasons' crops—1931 and 1932—were employed and the berries obtained from Massachusetts, Maine, and Newfoundland.

Preliminary tests on vitamin A on Maine quick-frozen dwarf type blueberries indicated no significant evidence of protection, with the conclusion that these blueberries contained only a trace of vitamin A. In the case of vitamin C, two successive crops of high-bush blueberries indicated a minimum protective dose of 4 to 5 gm. with little or no loss due to quick freezing. Both season's crops of the Massachusetts high-bush type, blanched and canned, with or without vacuum, resulted in a severe scurvy. With Massachusetts high-bush blueberries for two seasons canned without blanching and in

vacuum, there was no scurvy. Low-bush blueberries showed much less vitamin C and variations both seasonal and regional with the best results on the Maine low-bush type. One sample of canned low-bush blueberry showed very little protection from scurvy—C. R. Fellers and P. D. Isham, *J. Agri. Res.* 47:163 (Aug. 1), 1933.

### Vitamin A Content of Milk Irradiated by Various Carbon Arcs—

In order to determine the destructive effect on vitamin A of ultra-violet rays, 3 types of carbon arcs were used—the therapeutic "C" carbon, the magnesium impregnated carbon, and the Sunshine carbon. Milk of 1.2 per cent butterfat content was irradiated in thin films and then desiccated and hermetically sealed in jars under inert gas. The exposure varied from 8 to 48 seconds.

After the experimental rats showed vitamin A deficiency, the reconstituted dried milk was fed at levels of 2.5 and 5 c.c. daily. The growth curves on lots of 4 to 15 rats on the experimental feeding period showed practically no variation at either the 2.5 or the 5 c.c. level, as to destruction of vitamin A. The conclusion was drawn that there is no significant destruction of vitamin A in milk containing 1.2 per cent butterfat on direct irradiation under conditions of the test.—R. C. Bender and G. C. Supplee, *Am. J. Dis. Child.* 45:995 (May), 1933.

# CHILD HYGIENE

## CHILD HEALTH AND CHILD WELFARE IN ENGLAND

RICHARD ARTHUR BOLT, M.D., DR.P.H., F.A.P.H.A.

*Director, Cleveland Child Health Association*

*At Present on Oberlaender Trust Award to Study Child Health  
and Welfare in Germany and Austria*

TWO important conferences on child health and welfare were held in England this summer which the writer had the privilege of attending. The Congress of the Royal Sanitary Institute convened at Blackpool from June 17 to June 24, at which time one of its sections was devoted wholly to problems connected with Maternity, Child Welfare and School Hygiene. The other sections on Preventive Medicine; Architecture, Town Planning and Engineering; Veterinary Hygiene; National Health Insurance; and the Hygiene of Food contributed directly or indirectly to child hygiene. The discussions evoked by the formal papers were right to the point and timely. The entire Congress moved with a precision and orderliness characteristic of British Medical Officers of Health.

The Sixth English-Speaking Conference on Maternity and Child Welfare, organized on behalf of the National Council for Maternity and Child Welfare, under the devoted and able leadership of Miss Jane Halford, took place in London, July 5, 6, and 7. On two days preceding this conference a post-graduate course was conducted for the benefit of those attending so that they might observe first-hand the technics employed at the Royal National Orthopaedic Hospital, Queen Charlotte's Hospital (Maternity) Isolation Block, North Kensington Women's Welfare Center, Mothercraft Training Society

and the Home, and New Princess Elizabeth Hostel. The whole conference brought out clearly the intimate relationship which exists in England between voluntary and official organizations for maternity and child welfare. The fact that advance copies of the conference papers were in the hands of the delegates made possible an intelligent and very lively discussion of each subject.

The address on the Training and Qualifications of Nursery Nurses by Viscountess Erleigh,<sup>1</sup> President of the section on Maternity, Child Welfare and School Hygiene of The Royal Sanitary Institute, so well describes the development of a rapidly growing movement that it may be of interest to quote at considerable length in this place:

The movement for the provision of skilled and trained care of the normal healthy child was commenced in 1892, when Mrs. Walter Ward first conceived and carried through the formation of the Norland Institute for private nurses. . . . Far-seeing women even so long ago realized the demand that was just formulating itself and, as has been amply proved, was bound to increase, for the services of educated women trained to care for the physical and mental needs of the average baby and growing child.

They also appreciated that there were a number of such educated women in the country, who would welcome the opportunity of training, and of the career which has since become known as that of the college-trained, or nursery nurse. . . .

Those who came forward to deal with the

situation, with great wisdom decided to staff the homes that were needed, with young girls of good education, who after such training would be in a position to earn their own living. At just this psychological moment there was simultaneously a great demand, on the part of young women, for independence, and in many homes an economic necessity that the girls should adopt a profession or career. . . .

In 1925 there were 17 colleges and training schools, well known to be efficient and of a high standard of training; but there was no machinery for the interchange of ideas or protection from the numerous little homes that were springing up which, purporting to give a free or nominally free training, took advantage of students coming to them to run their homes cheaply, but gave no real training in return. It was necessary to protect both the established colleges and the prospective students from these conditions.

An Association of Nursery Training Colleges was then formed under the leadership of Hon. Mrs. St. Aubyn who acted as Chairman of the Executive Committee during the first difficult years of its organization.

The Council was constituted so that the representatives of the colleges, the principals themselves, and their matrons or wardens, representatives of the nurses, and representatives of the employers (that is, the mothers) all found a place on it. This body then formulated a standard to which any affiliated college must attain. This was the first attempt to lay down a general standard for the training of nursery nurses—a matter of the highest importance. The fact of affiliation to the Association of Nursing Training Colleges from then on guaranteed that a college was competently run, and the training given sound. . . . As the work of the Association developed it became apparent that in order to sift the numerous applications for affiliation from training schools, and to be certain of maintaining the standard of training among the now numerous colleges affiliated, the Association must appoint its own inspector.

This inspector's chief duty is to report on the training given to students; for while many colleges are under inspection from the Ministry of Health or Local authorities as regards their sanitary arrangements and care of the children under their charge, no inspector existed whose duty it was to inquire into the training of the students received.

The results have shown that the appointment was a wise one.

Last year the Association took a further and most important step—the arrangement in conjunction with the Royal Sanitary Institute of a central examination for nursery nurses. During the course of the year a number of meetings were held at which the matter was fully discussed. Every college, of course, had its own internal examination, both theoretical and practical, and granted certificates to its students who proved successful. A number of the younger colleges, however, had adopted the examination set by the National Society of Day Nurseries as their theoretical examination, and the demand came chiefly from them that the Association should have its own examination. The Association therefore set about discovering ways and means, and finally, after consultation with the Royal Sanitary Institute, decided that they could have no better medium than the Society for conducting their central examination. A syllabus was prepared by a joint committee, and in particular Dr. Fenton gave invaluable help with practical suggestions.

It was agreed that the examination should be optional and not compulsory, and that it should be based on the widest principles of child care and training; in fact that it should embrace all such matters as were considered fundamentally essential in the training of the nursery nurse. . . . Particular care has been taken to keep the syllabus on general lines so as to avoid the possibility of interfering with the special characteristics that particularize many of the colleges. The Association does not want to turn out a regimental true-to-pattern type of nursery nurse. . . .

The examination consists of both written and *viva voce* tests, and the examiners are drawn from members of the Council of the Association of Nursery Training Colleges, and from nominees of the Royal Sanitary Institute. The first examination took place in London last July, and the results were most gratifying. . . .

This year a further advance is being made in the addition of two separate advanced papers, one on child psychology, the other on child nutrition, which are to be open to students who have passed the central examination.

The Association is deeply concerned in the status and welfare of the nurses, and for this reason has opened a club in London to cater to their needs when they are out in posts. It is its object and great desire to raise the status of nursery nurses in every respect, so



that such nurses may become recognized by the public at large for what they are—one of the most valuable and necessary factors in the upbringing of the future generation.

In his presidential address to the Sixth English-Speaking Conference on Maternity and Child Welfare, Sir George Newman, Chief Medical Officer to the Ministry of Health and the Board of Education reviewed the progress made in child hygiene in England and Wales during recent years. He summarized the gains made as follows: <sup>2</sup>

1. The burden of infant mortality in England and Wales, though coming to us from the Middle Ages, has been halved in a single generation (*i.e.*, since 1910).

2. This saving of life under 1 year of age has been least in the first month of the first year, and particularly in the first week, and greatest in the subsequent 11 months, a significant characteristic and an indication of the direction of future work.

3. Infant mortality increases with urbanization, from rural to city life, and the urban excess tends to increase throughout the later months of infancy, the months affected by the unfavorable elements of environmental influence.

4. The reduction has been greatest in deaths due to infantile diarrhea and enteritis, to bronchitis and pneumonia, and to whooping-cough, and it has been least in those deaths primarily due to prematurity of birth.

5. Lastly, congenital defects, and principally congenital malformation, have steadily increased in importance among the causes of infant mortality. In 1925 congenital malformation was the certified cause of 3,253 deaths, and in 1931, instead of showing a reduction of, say, 15 per cent (as did the total

infant mortality), it showed an increase to 3,494. In fact, the rate of infant death from this cause rose from 3.98 per 1,000 live births in 1921 to 5.53 per 1,000 in 1931. This variation has occurred particularly in the industrial urban districts of the North, and is in part at least assumed to be due to more accurate diagnosis and certification; but the change and its causes need watching, though we cannot pursue the matter on the present occasion.

He stated further:

We must all, State and voluntary movement, work together for better midwifery and the preparatory stages leading up to it, and for much more thorough nurture of the child under 5 years of age—up to the present regarded, I am afraid, all too commonly as a negligible commodity—by home visitation and domiciliary supervision; by much fuller development of maternity and child welfare centers; by means of day nurseries and nursery schools; and by the use of convalescent homes, hospitals or sanatoria for amelioration, discipline, and direct treatment of the little child before its school days begin. When this movement began, the children coming to school for the first time at 5 years of age were as sorry a bunch of human neglect as could be seen, but today they are much better in every way, and it has been demonstrated at Warrington, Willesden, Darlington, Torquay, in Westmorland and elsewhere, that this hopeful change has been directly due to the influence of the maternity and child welfare centres.

#### REFERENCES

1. *J. Roy. San. Inst.*, LIV, 3:125-128 (Sept.), 1933.
2. *Mother and Child* (Formerly National Health), the official organ of the National Council for Maternity and Child Welfare, for full reports. IV, 5 and 6 (Aug. and Sept.), 1933. Address by Sir George Newman in Aug., pp. 160-164.

## CLASSES FOR EXPECTANT FATHERS

ELDRED V. THIEHOFF, M.D.

*Acting Director, Cleveland Child Health Association, Cleveland, Ohio*

WHO ever heard of classes for expectant fathers? Due to the efforts of the Cleveland Child Health Association the city of Cleveland lately has heard of such classes for men whose wives are pregnant.

Prenatal classes for mothers have been held in this city since 1922 in connection with prenatal clinics. Here the expectant mothers are instructed not only in matters relating to the prenatal period, including personal hygiene of

pregnancy, but also in mothercraft and child care. The instructor of these classes has been asked so many questions by the mothers as coming from their husbands, that it was realized that the men were not only in need of information but actually were seeking it.

After all, the bringing of a baby into the world is a partnership affair, and simply by the act of his wife delivering a baby, no husband is automatically made an ideal father. The men need to be trained as well as the women. Then, too, many mothers, in properly caring for their baby, meet with the resistance of the uninformed husbands. For example, many mothers state that they cannot keep their babies on a feeding schedule for the fathers insist that babies should be fed when they cry.

In this age of economic depression, many mothers are the bread-earners, leaving the fathers at home to care for the children. In such cases the father surely should know how to care for the child. This is a changing age, and many are entering fields of endeavor formerly thought to be restricted to the opposite sex. We hear of classes in cooking for high school boys, and now classes for expectant fathers.

The first class for fathers was established as an experimental project by the Cleveland Child Health Association at the University Nursing District (a teaching center for public health nurses) with the idea that if it proved to be successful the class later might be established in other parts of the city.

Contacts with fathers were made through the prenatal clinics held at the center, through announcements made in

the prenatal classes for mothers, through nurses making home calls in the district, and through newspaper publicity.

The first class was held on September 6, 1933, one being held each week thereafter for a total of 15 sessions. No charge is made and any man is welcomed.

The first 3 sessions were held by the writer. They covered the prenatal period. Dr. J. J. Thomas, Clinical Professor of Obstetrics at Western Reserve School of Medicine, is now holding the next 6 sessions, which are devoted to a study of the birth of the baby and its care during the first year of life. I shall then hold three classes on the pre-school child, the school child, and common diseases and disorders of childhood. Dr. Oscar Markey, Assistant Professor of Mental Hygiene, Western Reserve University, will conduct the last 3 sessions, covering child behavior problems, discipline, and child guidance.

The class has been very successful, having an enrollment of 35. Each session lasts for 1 hour—from 7:00 to 8:00 p.m. The first half-hour is given over to lecturing and the second half-hour is reserved for individual conferences to discuss privately individual problems. The men are all very interested and have many questions to ask. It is interesting to note that the enrollment includes a graduate of a large state university and a minister. A few of the men come considerable distances from outlying parts of the city to attend the class. It is hoped that this project may be extended in the near future, thus insuring for the community an informed group of fathers.

## PUBLIC HEALTH NURSING\*

A SCHOOL NURSE WRITES TO THE STATE  
BUREAU OF PUBLIC HEALTH NURSING

*Her Letter*—"We have a problem on which we need advice. The Community Chest is going to feed the poor children in our schools. The children are to be chosen by the teachers who make home calls on all their families. The food is served at noon in an empty room. It is prepared, taken to the schools and served by women who are in need of employment and are being helped by the community chest.

"These are the usual menus with some variations:

*Monday*—Bean soup and crackers, fresh apple, milk.

*Tuesday*—Jelly and peanut butter sandwiches, apple, milk.

*Wednesday*—Vegetable soup (ground meat included), apple, crackers, milk.

*Thursday*—Hot dog sandwiches, stewed fruit, milk.

*Friday*—Chili and crackers, apples, milk.

"The teachers prefer the milk lunches twice a day for it is not so messy. However, they will do whatever is best for the children. What is best?

"The expense was about \$100 per month last year. It will be more this year for the food is higher and there are more children to be fed."

*Our Reply*—"It is hard to say what, in general, should be done about feeding children at school for each community situation is different. The latest and most authoritative advice we have about supplementary feeding is that in the White House Conference Publications, *Growth and Development of the Child*, and *The School Health Program*.

"This report says, 'The school should feel obligated to provide a lunch at school whenever the distance is too great for the children to go home at noon or when they would not receive a suitable lunch if they went home.' This leaves no question about the school's responsibility to furnish a noon lunch for the children who have too little to eat at home.

"There is, however, a question about the value of the mid-morning and afternoon milk lunches. This same publication makes these recommendations:

"'Because it stays so long in the stomach, milk is of questionable value when fed in the middle of the morning at school to children who have poor appetites.

"'Even if breakfasts are inadequate, children should be taught to eat them at home; milk and fruit should be increased in the home diets rather than introducing an extra meal at school.

"'Milk may not be the food needed. The type of food that will best supplement the home diet should be chosen.

"'The wisdom of feeding all children or merely the malnourished should be carefully considered.'

"Have you thought about the most important step in planning—a strong central committee? On this committee should be a representative from the Community Fund to care for financial matters, a representative from the Medical Society, yourself (the school nurse), and the home economics teacher to supervise selection and service of food, someone to represent the school to arrange for selecting and transporting the children and some reliable women of the community to supervise buying and preparation. Such a project as this needs careful planning and organization.

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

"You as school nurse can help so much by suggesting time of serving, methods for handwashing, helps for maintaining the right mental attitude of children, parents, and workers toward the project, and by helping to make it an educational affair. You can also help the teachers in their investigating and selection of children by checking with physicians, relief organizations, Red Cross, trustee, attendance officer, etc., and by adding to theirs your knowledge of the home conditions of the children. The selection should be based not on underweight or present signs of undernourishment but on the basis of feeding those children who are not having and cannot have adequate food at home, with the idea of preventing a condition of malnourishment."

V. A. J.

#### PUBLIC HEALTH NURSES AS HOME HYGIENE TEACHERS

A short time ago we had the chance to attend a Home Hygiene Instructors' Conference given by an American Red Cross Nursing Field representative, and it was very inspiring to see how interested some 30 public health nurses were in the instructions, and how eagerly they took part in discussions.

The majority of the nurses present who were teaching home hygiene classes had never had any training in the principles of teaching, and this institute opened up a new world to them. They were especially enthusiastic about the morning program in which the following "Criteria for Teacher Evaluation" upon which each nurse was asked to grade herself, were discussed:

- A. The function of the teacher in the educative process is to guide and direct the activity or experience presented by the teacher with the approval of the pupil or set up, through pupil initiative, so that the best possible results, compatible with the educational objectives, may be attained.
- B. In order that the teacher may function

with maximum efficiency the following facts must be considered:

1. Strong physique and good health are essential to continuous success in teaching.
2. A pleasing, well-modulated voice and clear enunciation are important qualifications for teaching.
3. The teacher should be well groomed and appropriately dressed.
4. The teacher should use clear and correct English.
5. The teacher should know the subject he is teaching.
6. The teacher should understand and use the principles of good teaching.
7. Among the qualities desirable in teachers, the following are important:
  - (a) *Self-control*, the ability to maintain a well balanced poise at all times.
  - (b) *Tact*, the ability to handle all sorts and conditions of people with skill and discernment.
  - (c) *Decisiveness*, the ability to make a decision promptly and stick to it.
  - (d) *Enthusiasm*, an invaluable tonic for both teacher and pupils.
  - (e) *Resourcefulness*, the ability to turn an unexpected situation to good use.
  - (f) *Sympathy*, the ability to understand and appreciate the point of view of another person.
  - (g) *Fairmindedness*, the ability to think impersonally and to act justly.
  - (h) *Open-mindedness*, the ability to see all sides of a question.
  - (i) *Sense of humor*, skill in handling the humorous situation cleverly.
  - (j) *Fairness*, ability to mete justice, sincerity, frankness.
  - (k) *Diligence*, adequate preparation to handle the work efficiently.
  - (l) *Originality*, ability to enrich the experience with novel variety, interesting materials and activities.
  - (m) *Initiative*, ability to put a program across.
8. Teachers should not talk too much. Pupil activity is more important than teacher activity.
9. Teaching is a *coöperative project*. The problem is the acquisition of the desired knowledge, habits, attitudes, and ideals by the pupil through the *skillful guidance* of the teacher.
10. Skillful guidance is at all times conditioned by the professional *ethic* of the teacher-*guide*.

E. F. M.

## FEDERAL FUNDS FOR VISITING NURSING

One of the most important milestones in the history of public health nursing has been reached with the announcement that federal funds will be made available to provide bedside nursing care in the homes of "recipients of unemployment relief."

The announcement affects to some degree most agencies giving bedside care on a visit basis. This care will be paid for from the funds of the Federal Emergency Relief Administration at a flat rate per visit "not to exceed the certified cost per visit established for accredited visiting nurse associations in the state or local district."

The full plan is published by the F.E.R.A. in a bulletin called "Rules and Regulations No. 7" and may be secured from state or local relief administrators. Presidents of state or local professional organizations will be called upon, under the plan, to designate com-

mittees to consult with relief administrators on the formation and "adoption of adequate programs for medical, dental, and nursing care in the homes of indigent persons."

Immediately on receipt of the news, the N.O.P.H.N. sent out a memorandum to State Health Departments; Presidents of State Organizations for Public Health Nursing; Presidents of State Nurses' Associations; and to its own corporate agency members.

Long before this plan was made public, representatives of the National Organization for Public Health Nursing were called into consultation with Harry L. Hopkins, F.E.R.A. administrator, in relation to the establishment of the principle that bedside nursing care should be provided from public funds for those in families of the unemployed on relief funds who are sick at home.—News Release—National Organization for Public Health Nursing, Oct., 1933.

## EDUCATION AND PUBLICITY\*

### HEALTH DEPARTMENT LEADERSHIP THIS FALL

**T**HE local Health Department has a fresh opportunity this fall for expressing leadership in the field of public health education.

The calling of a conference or a group of conferences of local health agencies and cooperating groups could be one useful form of leadership.

**United We Stand—And Go Forward—**Get and give a perspective of the winter's activities in health education by calling a conference, or several conferences in larger cities. Invite all health agencies, all social agencies concerned with any aspect of health, and

the varied organizations of adults and young people which have health as an accepted feature of their program.

The representatives might be cautioned to restrict their statements to purely health education activities. Each might be asked to answer as concisely as possible such questions as these:

What subjects will you emphasize?

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Rautzahn, 130 East 22d St., New York, N. Y.

What audiences or groups do you expect to reach?

What will you do in the way of talks, printed matter, bulletin boards, articles in bulletins or house organs, motion pictures, etc.?

Where will you get your materials?

What information do you need?

What special events do you plan?

What coöperation would you like to receive?

What materials would you like others to use for you?

Following each report a few minutes might be given for questions from those present.

In some cities mimeographed summaries of the answers might be desirable and practicable.

*Where the health department does not feel free to take the initiative may it not be done by the health council, the council of social agencies, the social work publicity council, or by an individual agency?*

**Letters to Editors Will Help—** Please write letters to newspaper and magazine editors when you like their articles on health and other welfare subjects.

Sincere letters of appreciation from people who have read an article are always welcome to the editor.

Articles in local newspapers have one kind of value to health work. Articles in other types of periodicals, whether they are local or general in their circulation have another kind of value. The two supplement each other in their help to health work.

Nationally circulated periodicals are particularly useful in reaching leaders in the groups touched by their circulations.

*Please write to the editors.*

**How It Looks to Them—**The September bulletin of the Social Work Publicity Council contains examples of the effective interpretation through experience stories. A letter to the editor

in *New York World-Telegram*, August 22, is quoted with this comment:

The skill in the letter lies in his picking out one point which epitomizes his feeling of helplessness as month after month spent in bed goes by. "When we are well we take pants as a matter of course. They are just the things that we wear in order to keep up with the Joneses. But maybe we never have realized that it is possible to develop a real affection for pants. You get so you lie awake at night in a hospital and keep saying to yourself: 'Oh, if I only could have a pair of pants!' When the nurse comes in you say as nonchalantly as though you were reaching for a Murad: 'Good morning, Miss Brown. Will you kindly bring me my pants?' Certainly she won't. Your clothes have gone into hiding, feeling naked and ashamed, no doubt, because there's nobody inside of them. Well, one morning the nurse came into my room at Grasslands and said: 'We are going to let you get up and dress today.' Just think of that! After 13 months I was to be permitted to wear pants. Not only pants, but a shirt, a coat and a vest—a tie, even."

**Radio Coöperation—**D. Oberteuffer, professor of physical education, Ohio State University, Columbus, writes about a project in

Radio broadcasting over our University station, during which periods we will give current events and topics of public interest relating to personal and public health. I am interested, of course, in making these broadcasts scientifically accurate first of all, and interesting to the laymen at the same time. If, from time to time, your association distributed literature of one kind or another which might be suggestive of some material for these broadcasts, I would be happy to receive such and to use it with proper care and due credit to your organization.

Please address Professor Oberteuffer as noted above.

**Local Motion Picture Clinics—**The amateur movie offers a practically new medium for reaching many audiences with practical health teaching or the presentation of the activities of health departments and other health agencies.

Showings of pictures produced in other cities offer the simplest and best

material for studying amateur picture technic.

The health officer could take the initiative, or the health council, the health division of the council of social agencies, or an individual health worker. Gather a group of health workers (others interested in amateur pictures would be helpful), and arrange for screening pictures which may be available. Discuss each picture, searching for lessons in picture technic, and their application to the problems of those present. Make notes which might interest the producer of the picture discussed.

The editor of this department will give information about pictures from other cities.

**Planned Objectives for Literature Distribution**—The 1929-1933 report of American Society for the Control of Cancer states that—

Before 1929 the Society was broadcasting great quantities of its literature to those who, for one reason or another, requested it. On paper this produced a somewhat impressive showing. With the appointment of additional field representatives, however, it soon became evident that such a procedure measured the gross rather than the net educational value of our work.

There has, therefore, been developed a policy by which the distribution of literature to specific groups for a definite objective has gradually replaced the former method. Since education may be fairly measured by the number of minds affected, just as marksmanship may be evaluated by the number of hits on the target, the change is a wise one. It has further led to a more carefully prepared type of literature. Each new pamphlet is published to fill a definite educational need.

At the present time, more and more of our distribution is being made at the specific request of our state chairmen and field representatives and is an integral and important part of planned and organized local educational programs. The indiscriminate and extensive broadcasting of printed material is folly, both from an educational and a business point of view. While the total amount of general distribution has normally declined, the cost of the literature to

be distributed has not declined in like proportion. This is due to the fact that our booklets have been materially improved both in make-up and in size.

The report also tells of a series of 13 brief news releases available for local use. Also—

A series of 16 radio broadcasts of varying lengths, with instruction sheet, has been prepared and is being widely used, particularly in the southern states where active educational campaigns are now in progress. Radio broadcasts from other sources are being mimeographed for distribution, with the objective of eventually building up an extensive library of such material.

Motion pictures are supplied for medical audiences, as well as exhibits, chiefly for medical groups. Address the Society at 1250 6th Ave., New York, N. Y.

**Reporting via Mimeograph**—Accompanying the 1932 Annual Report of the Knoxville, Tenn., Bureau of Health is a slip reading as follows:

This publication was compiled and mimeographed entirely by regular employees of the Bureau of Health who will welcome the receipt of any comments, suggestions, or criticisms.

It is a beautifully done piece of work, quite ambitious in some details—56 pages, 8½ by 10¾ inches, green paper, plus 8 black pages, 4 of which carry quotations, a table of contents, and an index. Partly in two colors, with numerous statistical tables and diagrams, all done with neatness and accuracy, and evenness of touch on the whole job.

Another very attractive mimeographed report is called *Common Cents* issued by the New York Tuberculosis and Health Association with the same note that—

This report has been prepared at our own office to save the expense of printing.

In fact the office cost of 5,000 copies is \$175 against the printing cost of \$350. 27 pages, 5½ by 8¾ inches; on both

sides of the sheet, which added to the production difficulties.

Miss Maier describes the very careful preparation that a mimeographed report comparable to printing must go through:

In setting up a book of this type it is necessary that before the final copy goes to the mimeographer all re-editing, spacing, etc. be absolutely completed, and a perfect example of what the final mimeographed book will be like. I believe it was necessary to type and draw our book over six or seven times before the final version was ready—these various re-typings corresponding to the re-setting of lines, re-dummyings, etc., that would take place on printers' proofs. In this particular instance the situation was greatly complicated by the fact that the text had to run around the drawings so that in correcting "widows" and other bad makeup it was necessary to reset the whole page in order to see how far down the text then came with the drawings on the page, instead of being able merely to shift lines around as one could do when there are no drawings interfering. Then, too, such a change—say on page 5—would automatically affect pages six and seven, and since the typing had to be done on folded pages on which five would be on one side and twenty-four the opposite page, both of these leaves would also be affected by the changes.

In short, as you may guess from the above, it was a very, very wearying and tedious job, and while I think the drawings greatly liven up the text, a book without them could be done in about one-fourth the time.

*Hygeia* for October, 1933—"Waiting for the Doctor and Making the Doctor Wait" (a cartoon); "Heart Disease—Then and Now"; "A Housewife Looks at the Committee on Foods" (of the A.M.A.); "Worm Powders" (ignorance is not always bliss); "The Curse of the Fire Spirit" (fire dangers); "The 'Demon' Housekeeper" (a symptom, not a vice); "Salvage" (reclaiming the "Polio" victim); "Should Your Child Wear Glasses?" "At a Century of Progress" (illustrations of scientific exhibits); "Wings of Death" (what quarantine does); "Safeguarding the Athlete's

Health"; "Progress in Preventive Medicine" (part 8); "Training for Athletics and Health" (part 10); "The Old-Time Doctor"; "Craftsmanship in Canning"; "Sex Education" (part 4—The Teaching of Sex to the Young Child); "I Want to Know" (part 2 of "A First Physiology"); "New Books on Health"; "School and Health," including "The Passing of Half Truths in Health Education," several examples of teaching methods and materials and "New Health Books and Teachers' Materials." — *Hygeia*, 535 North Dearborn St., Chicago. Oct., 1933. 25 cents.

#### A Health Education Exhibit--

An exhibit which enlivened an annual meeting is described in *Public Health Nursing* for October, 1933.

The Cleveland Health and Parent Education Association made its customary methods of teaching health and care of the sick demonstration at the annual meeting to which 1,000 invitations were issued.

We felt that our aims had been realized: we had been able, first, to interest an infinitely larger number of people than we could have done with the usual annual meeting and, second, our visitors will henceforth know what is taught in health classes and how it is taught. Furthermore, many are interested enough now to pursue health education for themselves and to interest others in doing so.—

ETHEL M. HANSON, R.N.

To Editors of Health Bulletins and Magazines—An editorial writer on a metropolitan daily was persuaded by William McAndrew to read the editorial pages of over 200 educational magazines. Mr. McAndrew in a talk to the Educational Press Association of America in February, 1933, reported the conversation following his reading.

Perhaps some of us who write editorial pages need to take the conversation to heart.



"This is the worst afternoon," my victim said, "that I have had in many moons."

"What's the matter with them?" I said.

"Nothing," he replied. "That's the trouble with them. They don't matter. These chaps don't write their editorials until the last minute. Nothing worth while can come to a man the last minute. An editorial writer must be composing editorials all the time. When he hears a speech or reads one, when he glances through a magazine or, as he must to keep alive, when he reads the books of a master, he must out with pocket notebook and jot down the by-products that snap into his mind. Just as a reporter gets so that everything he sees and hears is analyzed by him for its news value, so the editor is perpetually looking for editorial ideas. He runs over the large events and finds an idea that his paper should push with vigor and punch. He digs into his memory and into his books for illustrations or arguments to enliven his theme, but his ideas flash on him everywhere. The pocket notebook, small size, with detachable leaves, is an indispensable tool of the journalist. Your editors show no sign of having any."

That's a little thick, but it seems to contain a usable idea.

**For Camp, Club or Institution—** You may have a group of children or adults for whom you wish ideas or inexpensive materials to provide simple entertainment or occupation, or incidental education.

An aid in that direction is "Illustrative Materials and Publications," a 5-page memorandum which explains and gives information for securing the source publications whereby you may locate a vast array of pictures, slides, motion pictures, posters, exhibits, plays, story-telling helps, etc., etc. References to specific health material are limited, but there seem to be important uses for other subjects in hospitals, sanatoria, summer camps, and elsewhere.

Reception rooms of clinics, for example, might be more attractive and restful for the occasional use of non-health material on the walls or in the slide or motion picture projector.

"Illustrative Materials and Publica-

tions" is supplied by Social Work Publicity Council, 130 East 22d St., New York, N. Y. 6 cents; 2 or more copies, 5 cents each. ☉

**Professionals as Volunteers—**It started in this idea penned by Alma C. Haupt in *Public Health Nursing* (Aug., 1933—"Informing the Public and Money Raising"):

Even though agencies cannot employ full- or even part-time special publicity workers, they may carry the work through a publicity committee of the board, with the help of the nurse director and the staff. Every large community has writers, artists, and advertising experts who make helpful members of this committee.

To answer a query as to what local nursing agencies were making use of writers, artists, and advertising specialists, Miss Haupt wrote to 10 of the locals. Here are extracts from their replies.

"During one year we were able to have a professional person give us about one-half day a week in which she wrote letters to the newspapers, articles, etc., that would give us publicity for our service. As you know, we did not attempt through this publicity to get funds but simply to tell the community about our service."

"We have had some help from a newspaper writer on rewriting some of our newspaper stories. We have also had posters made by the students of the art department of the local high school. We have never asked aid of an advertising expert, but that might be an advisable thing to do."

"We have not had the value of writers, artists or advertising experts on our Publicity Committee since I have been in ——— but I believe that it would be desirable, provided the professional writers, artists, etc., and the remainder of the committee would work together on their projects. I recall two instances where the professional newspaper person on a V.N.A. job found it difficult to put his emphasis in the places thought important by the V.N.A. I think some V.N.A.'s labor under certain publicity inhibitions which may or may not be good for their organization, and which are quite often difficult for a professional newspaper person to understand."

"We have at present on our Publicity Com-

mittee Mr. ——— who is secretary of the ——— newspaper and a newspaper man of considerable standing, obviously. We also have Mrs. ——— who was publicity and finance secretary of a national organization before her marriage. We do not have other members who are specialists. I think the idea sounds excellent where they are available and where the board considers members outside of its own board of directors for members of the committee."

"Our publicity we believe should be headed up by some member of the Board who would draw on members of the association and community for assistance. This delegation of responsibility has not yet been done. The chairman of our Nursing Committee has been of great assistance in securing publicity for the organization, however."

"I enclose our annual report which has original illustrations to show how we used the artistic ability of one of our Association members, who is the wife of a local physician. Mrs. ——— is now making a series of five posters using stick drawings to decorate our booth at the local Exhibition, which is to be held in September. She is illustrating our Nutrition Service in a way that we think will attract attention for its humor and originality. Our exhibit is entirely on the subject of nutrition this year. We have no writers of note in ———. I wish that we did. I realize how valuable assistance from one would be. Your letter convinces me that we should reach out even farther in the coming year to find aid in publicity and attach such persons to us through membership in our association where their abilities might be drawn upon in the interest of public health nursing."

"To date we have not used professional people in these groups on our Publicity Committee. We have, however, always had board members who showed what might be called a flair for publicity on the Publicity Committee, and our Annual Report Committee has been made up of people who were particularly interested in that type of publicity. We have used professional people indirectly, as for instance securing assistance from an advertisement writer who is the husband of a Branch Committee member, and the preparation of the graphic part of the Annual Report by an artist interested in the V.N.S."

This department would be glad to report any public health agency making use of outside specialists as volunteers in health education or presentation of the work of the organization.

One way to get new people interested in what you are doing is to get them to do something for you. It does not seem necessary to get them to join or otherwise formally to align themselves with your agency before asking them to help.

On the other hand it is better, usually, not to ask any untried persons to become committee members. As a rule it is safer to get their aid on particular jobs, try them out, awaken their interest, and inform them as to what you are doing and why. An invitation to committee membership may follow.

How and where to use the outside specialist will be discussed next month.

#### IT MAY BE HERE

Two men meet outside the office of "Dr. Jones." One man: "Hello Jim! How are you this morning?" Other man: "I'm fine! And I know: I've just had my annual physical examination." This is the story told by an illustration in *Health Bulletin*, Board of Health, Brookline, Mass. Sept., 1933.

"We Got Those Kiddies in the Nick of Time" is a 4-page illustrated folder explaining the Health Restoration Camps financed by the Community Chest, Cincinnati, Ohio. Enclose 3 cents for a sample. (But why did it not say "Kids"?)

"Statistics for All: The Fact Picture from Vienna is Significant Visual Aid," in *Educational Screen*, 64 E. Lake St., Chicago. Sept. 1933. 25 cents. With 3 examples of work by Dr. Neurath. (Those who wish to work with visual education departments of schools cannot well do without this magazine.)

"A Health Education and Publicity Program" is a reprint of articles from *American Journal of Public Health*, May and June, 1929. These articles were part of the two half-day sessions in which were discussed why plan, objectives, audiences, the facts, and the approach, are almost indispensable to those doing or supervising popular

health education. Copies of the reprint free from Russell Sage Foundation, 130 East 22d St., New York, N. Y.

*Mouth Health Quarterly*, 84 S. 10th St., Minneapolis, Minn., July, 1933, contains interesting reproductions of paintings on dental subjects, and of exhibits at Century of Progress; reproductions of well done mouth hygiene posters from Great Falls, Mont., school children; "Your Child's Teeth" (radio talk); "Jack and the Chew-Chew Fairy" (mouth health story): several pages of comment on publications such as public health workers wish to know about. Special contributions have enabled the American Mouth Health Association to reduce the *Quarterly* subscription to \$1.50 a year.

Another car card from the New York Tuberculosis and Health Association:

CLEANLINESS — GOOD FOOD

ADEQUATE REST — FRESH AIR

SUNSHINE — MEDICAL CARE

These help to prevent and to cure tuberculosis

The last sentence is run in red in one line across the card. Below it is As-

sociation name and address in white letters on a broad black band.

#### MAGAZINE ARTICLES

"The Depression and Our Health," by C. H. Gellenthien, M.D. *Kiwanis Magazine*, 520 N. Michigan Ave., Chicago, Ill. May, 1933. Interprets some mortality statistics; emphasizes possible future losses. 15 cents.

"I Bluffed My Way to Health," by W. C. O'Connell. *Saturday Evening Post*. Oct. 7, 1933. But exercise turned the trick.

"Making the Most of Sun Rays," by W. R. Ramsey, M.D. *Farmer's Wife*, St. Paul, Minn. May, 1933.

"Stroke Your Broom," by R. C. Moore and Janet Lane. *Collier's*. Sept. 23, 1933. How to change hard work into desirable exercise.

"Traffic Crimes and Criminals," by C. Billings. *Atlantic*. Oct., 1933. Unique police prevention of automobile deaths.

"Water Cure," by M. B. Ray. *Collier's*. Sept. 2, 1933. The varied values of the bath.

## BOOKS AND REPORTS

**Health and Environment**—By Edgar Sydenstricker. New York: McGraw-Hill, 1933. Published under the direction of the President's Research Committee on Social Trends. 210 pp. Price, \$2.50.

Mr. Sydenstricker defines environment as all those circumstances and conditions which affect man's health and well-being, excepting inheritance, and his book is a discussion of as many of these as there seems to be any chance of evaluating by the methods of statistical analysis.

The book is far more than a statistical treatise. It is an epidemiological monograph in which unusual trouble has been taken by a capable and experienced worker to find explanations for statistically expressed facts and to discover whether statistics can be adduced to demonstrate certain assumed truths.

Tables of data and diagrams made from tables abound, but they seem not to have been inserted so much to prove the coördination of health with environment as to show trends which call for explanation.

A subject candidly treated, and in need of general acknowledgment, is the fact that so many social and economic factors enter into the problem of lengthening life that it is impossible to ascribe all the improvement in the conquest of disease to the efforts which have been made directly against it. Tuberculosis, for example, is helped by whatever improves the social and economic status of the individual.

Some diseases, as smallpox, diphtheria and typhoid, against which specific and effective means of preventive or curative treatments exist, have,

of course, been reduced to an extent which statistical records well show. Certain industrial hazards have been eliminated or reduced, and tables are available to indicate these results.

It is interesting to see that the author declares that the span of life has not increased in recent years, although the average age today is greater than formerly. This, he explains, is due to the saving of life during infancy and adolescence.

The book is valuable for the frank and fearless way in which it deals with its subject. It deserves to be carefully studied by every health officer and epidemiologist, and should be in the library of all who wish to be well informed on public health values.

GEORGE A. SOPER

**Social Planning and Adult Education**—By John W. Herring. New York: Macmillan, 1933. 138 pp. Price, \$1.25.

In a period when social planning is a pressing need, this story of group thinking and planning in Chester County, Pennsylvania, is especially welcome. The author, who was director of the county health and welfare council, describes frankly the county's effort to study itself, to evaluate its problems, and to develop constructive programs.

A social planning program was begun before the war, having been locally conceived and initiated. Later, plans were devised in conjunction with the American Association for Adult Education, to use the county for adult education. These two undertakings were merged in 1929, the resulting project having three chief characteristics: (1)

county social planning, (2) the use of the county unit in adult education, and (3) the conscious use of adult education in making and carrying out a social plan. The movement "conceives, in a nutshell, that planning, the most comprehensive of social tasks, should be undertaken with education, the most effective of tools."

Consideration is given to both the successes and failures of the projects undertaken. There is much philosophy written around certain of the projects. Those engaged in county health and welfare work will find suggestions worthy of study. IRA V. HISCOCK

#### Water Pageants, Games and Stunts

—By Olive McCormick. Philadelphia: Barnes, 1933. 138 pp. Price, \$2.00.

This new and very interesting book with a foreword by Commodore Longfellow presents, not only to the beginner in pageant work but to the expert, a number of new and novel suggestions on water pageants.

Chapters are also found on costuming, make-up, music, scenery and lighting, how to write a water pageant, swimming formations, stunts, games and canoe regattas and a complete write-up of seven other pageants.

The organization of the material is to be commended. It logically presents the "how" of preparing such exhibitions and demonstrations and would be very helpful to those in camps and to people who are doing indoor swimming pool work where demonstrations are used for propaganda purposes.

HELEN COX

#### The Control of Football Injuries—

By Marvin A. Stevins, M.D., and Winthrop M. Phelps, M.D. New York: Barnes, 1933. Price, \$3.00.

This very interesting and instructive work which grew out of the criticism of the game of football and its associated

injuries is well worth careful study by anyone having any connection with an athletic organization. While it is primarily a detailed consideration of football injuries, their prevention and treatment, a great deal of the material can be applied to all other branches of sports and even to ordinary civilian practices and injuries.

The reviewer found a great deal of interest in the first chapter, which is concerned with training and physical equipment. Apparently Yale University has an adequate financial rating to carry out an almost ideal training system, which smaller colleges may find difficult; but in general, the principles laid down can be followed in any institution devoting a fair amount of attention and energy to sports.

Many of the chapters are devoted to a detailed consideration of all injuries possible, the greater majority of which never occur, and when they do, are usually competently handled.

Many doctors, who have been interested in sports, either as spectators or as medical advisors, have been distressed by the large number of preventable injuries and needless recurrences of those at certain typical points—knees, ankles, and shoulders. The time lost both from the standpoint of the team and the individual player reaches an enormous figure during a season. Everyone who reads this book will be impressed with the clear, concise exposition of the production of an injury, its prevention, and its treatment, and thus gain a more adequate conception of the control of football injuries.

The last portion of the book is devoted to the tabulation of the individual fatalities of the year 1931. The collegiate and high school fatalities indicate the advantage of competent medical supervision of the players, for in the sand-lot and unclassified group there are noted several instances—where

delayed hospitalization and medical treatment might be considered as contributory to the fatal outcome.

The book is profusely illustrated with photographs showing certain definite mechanisms for producing typical injuries which should be instructive to any coach or trainer. The keynote of prevention of injuries is felt throughout the work and is in harmony with every phase of modern medicine and public health. WILLIAM J. STEWART

**Procedures in Tuberculosis Control for the Dispensary, Home and Sanatorium**—By Benjamin Goldberg with a chapter on Sanatorium Planning by Thomas B. Kidner, and an Introduction by David J. Davis. Philadelphia: Davis, 1933. 373 pp.

The author, as Dr. Davis says, has seen fit to analyze and criticise various methods, procedures, and institutions evaluating them chiefly in terms of control. The book is divided into three sections. The first deals with the general problem, legislation, and the dispensary, to which most space is devoted. Here are to be found many suggestions concerning records, charts, dental clinics, valuable for those engaged in such endeavors. The second section discusses home treatment and the third the sanatorium.

Individual plans must be fitted to the needs of the individual city. The importance of the negro and Mexican problem in relation to tuberculosis is discussed. From figures given, the author estimates that there are 10 times as many patients with tuberculosis as there are beds available, which emphasizes the present importance of home treatment. The danger of the open case for the children in the household is stressed and attention called to the fact that in Chicago the number of these cases has been reduced to a minimum. Legislation is divided into enabling and coercive.

Throughout the book the need of coöperation with and protection of medical men is urged. Plans, personnel, and routine of the dispensary, education and publicity are freely discussed. Recognizing that the majority of patients sooner or later must be submitted to home treatment, details as to how this can be managed through the clinic are given. Following a detailed description of how a sanatorium should be conducted in the interest of public health, a helpful bibliography for those interested in the control of tuberculosis, as well as an index is given.

The book will prove to be a valuable help to all workers in tuberculosis for it covers many subjects that ordinarily are to be found only after much search scattered in many journals. It should be at hand for reference for all workers in tuberculosis. LAWRASON BROWN

**Proceedings of Southern Branch of the American Public Health Association, Held at Birmingham, Alabama, November 14, 15, 16, 1932.** New York: American Public Health Association, 1933. 100 pp. Price, \$.50.

The Southern Branch of the American Public Health Association was founded November 14, 1932. It has published here the proceedings containing its minutes, Constitution and By-Laws, and the papers read. The Western Branch submits its papers to the *American Journal of Public Health*, and then sends those which cannot be published in that *Journal* to other magazines which wish them.

The papers read were of excellent quality, and almost all of them had special reference to problems found in the southern section of our country, though some of them are of general application. We note particularly the paper by Dr. Leon C. Havens on the detection of typhoid carriers, which is characteristically accurate and shows

the quality of mind for which he was noted. His death since the meeting is a cause of regret to every member of the Association.

This volume possesses a value on its own account in addition to being the first publication by the Southern Branch. We have no doubt that the high standard set will be continued at future meetings.

MAZÏCK P. RAVENEL

*What Shall I Eat?—By Edith M. Barber. New York: Macmillan, 1933. 106 pp. Price, \$1.75.*

The author, lecturer on history of cookery, Household Arts Department, Teachers College, Columbia University, has written here a clear and comprehensive explanation of the uses of food to man. The facts are stated simply enough to be understood by persons not versed in the fields of science.

If every one could read the chapters on "Those Diet Fads" and "Those Food Prejudices," general conversation regarding these everyday topics would be materially changed.

Common sense menus are given for the ordinary daily diet, reducing diet, business man's or woman's diet, and weekly menus for a family of 5 at different cost levels. Changes which can be made and still meet the requirements of an adequate diet are noted.

This book is written in a humorous vein and should meet the needs of home folks, women's clubs, etc., as well as students and teachers of cookery.

BESS EXTON

*Dictionary for Nurses—2d ed. Compiled by Lois Oakes. Philadelphia: Reilly, 1933. 351 pp. Price, \$1.00.*

While Miss Oakes has supplemented the dictionary of medical terms in this small book with several tables meant to increase its usefulness, it still does not seem to be comprehensive enough to be adequate for general use.

A table of calorific values of foods lists only 9 articles of diet: three tables for infant feeding are given without any qualifying statement such as is found in our government bulletins, that all artificial feeding should be under the direction of a doctor.

The 4-page list of abbreviations of British degrees and diplomas would be of only occasional interest.

ALVA ANSTEAD

*Nutrition—By Graham Lusk. New York: Hoeber, 1933. 142 pp. Price, \$1.50.*

In the pages of history the aspirant to knowledge finds revelation and learns wisdom. In this, the tenth in the interesting series of primers on the history of medicine, he will find the narrative of the development of nutritional chemistry. He will not find the story of modern dietetics, but he will learn its important background.

Graham Lusk, eminent authority on physiology and biochemistry, completed the manuscript of this little book a few weeks before his recent death. In it he has presented in chronological order the events which led to the establishment of the newer knowledge of nutrition, and he has described with skill and perception, and often from personal experience, the men who have contributed most to the chemistry of foods.

The book is well printed, has 13 illustrations, and a good index, and it will prove of interest to all who seek to delve into the historical background of such a significant topic as human nutrition.

JAMES A. TOBEY

*Milk, the Indispensable Food—By James A. Tobey. Milwaukee: Olsen Publishing Co., 1933. 200 pp. Price, \$2.25.*

This book presents a number of essays which describe in a popular manner the many good qualities of milk and dairy products. The book is in-

terestingly written and conforms to Dr. Tobey's best style.

Essentially, the details are correct and the views maintained are modern and backed by ample authority. Use is made of the unusual and the out-of-the-way to stress certain points and to keep up interest. The popular presentation of the results of many nutrition experiments is particularly well done and brings constantly before the reader the indispensability of milk to the welfare of man. Some repetitions occur; and a very few errors.

The book can be heartily recommended to anyone who is desirous of learning something of the most interesting story of milk. Like milk, this book is easily digested and should be fully prescribed by all whose interests are in better health. C. R. FELLERS

**Children's Sleep**—By Samuel Renshaw, Vernon L. Miller, and Dorothy P. Marquis. New York: Macmillan, 1933. 242 pp. Price, \$2.00.

This is an interesting report of a series of studies on the influence of motion pictures and coffee on children's sleep, on the effects of loss of sleep, and on the critical frequency limen for visual flicker in children.

In making the study, the sleep movements of 170 children of both sexes, ages 6 to 18 years, were recorded during 347 nights. These children, in groups of 20, slept in single beds, each fitted with an electrical device which recorded the changes in posture made by the sleeper, minute by minute, throughout each night. The records of the study include a total of 3,591,000 minutes of sleep. Children of the Ohio State Bureau of Juvenile Research at Columbus were used as subjects. It was felt that these children represented a fair sampling of an average child population and that the regularity of living conditions at the bureau favored the general applicability of conclusions

based upon the experimental results.

To study the influence of motion pictures upon the sleep of children, successive groups of children were shown 58 different motion picture programs in the evenings before retiring. Increases in motility ranged from 0 to over 90 per cent. On the average, boys showed about 26 per cent and girls about 14 per cent greater hourly motility after movies than in normal sleep. The changes in motility were greatest in the fore-part of the night, when sleep normally is at its maximum. Children below 10 years of age were less influenced than the older children, the maximum effect occurring at about the age of puberty.

In studying the effect of coffee on children's sleep, it was found that coffee, in so far as motility is taken as an index, does not have the consistent detrimental effect on sleep that it is generally assumed to have. For some children coffee affected the sleep motility during the first 1 to 3 hours of sleep, for others during the middle of the night, and for a few it seems to raise or lower the general level of the motility curve throughout the night. Individual differences were so great that it was impossible to make general statements regarding its effect on children of the same sex or age.

An interesting section of the book is devoted to a study of the effects of loss of sleep on children. It was found that the effects of loss of sleep in children, where the deprivation has amounted to one-third of the normal ration, extended into several nights and that a single night is not sufficient for complete recovery.

The final chapter considers the problem of whether the intermittent illumination of the screen gives a flicker which induces eye-strain and nervousness in children attending a motion picture. Some interesting conclusions are herewith drawn.



Although this is a report of a series of experiments, it is given in a very interesting manner and will prove well worth the reading. It leads the reader to look forward to the final report of the larger and related group of investigations of the influence on children of motion pictures and their social potentialities, sponsored by the Payne Fund of New York.

ELDRED V. THIEHOFF

*The Common Cold*—By David Thomson and Robert Thomson. London: Baillière, Tindall and Cox, 1932. 738 pp. Price, \$15.00.

This consists of a monumental compilation of the world literature dealing with various aspects of inflammatory disease of the upper respiratory tract. The volume is a large one containing 738 pages and many excellent plates. Workers in the field find it the best reference book extant on the subject of colds. Its size will naturally limit its employment by the casual reader.

It is unavoidable that a work of this kind should suffer from a lack of continuity and consistency, in spite of the efforts of the authors to arbitrate conflicting points of view and to inject into the subject a critique based on personal bacteriological investigations.

It seems unfortunate that so much space should be devoted to a laborious description of the bacteria encountered in the upper respiratory tract at a time when the cultural and morphological changes encountered in bacterial dissociation are common knowledge. The authors seem rather reluctant to abandon their preconceived ideas as to the primary importance of these bacteria as the inciting agent of colds. Evidence is rapidly accumulating to support the hypothesis that filtrable agents are usually the factors of primary importance, and the rôle of bacteria is that of secondary invader of tissue previously damaged. The recent cultiva-

tion of such filtrable agents by Dochez and his coworkers demonstrates beyond question their existence, while the marked variation of bacteriological findings in the nasal secretions during a single outbreak of coryza points strongly against the etiological significance of ordinary microorganisms.

It is of little importance if the personal views of the authors do not meet universal acceptance. The style, the care and accuracy, and the thoroughness with which such a mass of knowledge has been organized and abstracted excites the reader to unbounded admiration.

FRANKLIN M. HANGER

*Selected Recreational Sports (for Girls and Women)*—By Julia H. Post and Mabel J. Shirley. New York: Barnes, 1933. 127 pp. Price, \$2.00.

The New Deal offers more leisure time. The machine age brings in its wake shorter working hours and the problem—what are we going to do with this time? Our educational program has neglected to prepare us to meet the situation adequately and this book offers some helpful suggestions.

The activities presented in the volume require little equipment at a minimum cost for small groups. Although the volume was prepared for girls and women the material presented is also adapted to boys and men or mixed groups.

The following sports are presented: deck tennis, horse shoe pitching, badminton, table tennis, shuffleboard, clock golf, paddle tennis, and tetherball. Suggestions for the organization of a sports program, the care and sources of equipment, and diagrams for setting up play areas for these sports are given.

The book is well worth while and should find a useful place in the home, at the club, in the school, at the playground or wherever sports of this type have a place.

HUBERT E. BROWN

Abderhalden's Handbuch der Biologischen Arbeitsmethoden — Vol. XIII, Book 2, No. 8. Berlin & Vienna: Urban & Schwarzenberg, 1933. Article 1—*Auswertungsmethoden für Pockentymphen und Pockensera*, by Stravros Zurukzoglu, pp. 1141–1190, 12 figs. Article 2—*Das Anaphylatoxin*, by E. Friedberger and J. Weissfeiler, pp. 1191–1242, 3 figs. Price, M. 5.80.

The first article in this instalment of Abderhalden's handbook of biological technic is a comprehensive survey of the evaluation of smallpox vaccine and vaccinia antisera.

After a short discussion of the fundamental principles, the author describes the various methods of testing the potency of smallpox vaccine on human subjects, calves and rabbits. Complete details are given of the methods approved by the smallpox commission of the League of Nations. These comprise the technics of Gins, Groth, Sobernheim and Calmette-Guerin, under the latter method being considered its modifications including that of Force and Leake.

A section follows on the testing of dry lymph and a suggestion is made that governmental agencies concerned with the supervision of biologic products should maintain a standard dry lymph with which could be compared samples from producing establishments. The next section lists the countries officially testing their vaccines and the methods used.

The testing of vaccinia antisera is discussed in a similar manner. In view of the fact that vaccinia immune serum has been used in the treatment of the encephalitis following vaccination, the author amplifies a suggestion made by Groth in 1930 to the effect that such sera should be prepared, standardized in terms of neutralizing units, and made available for emergency use.

In an appendix are assembled certain

Prussian orders and circulars dealing with the testing of smallpox vaccine and the treatment of encephalitis following vaccination. There is a rather complete bibliography. JOHN N. FORCE

In the second article the authors review only the more fundamental papers in this field, which still awaits satisfactory clarification. They define anaphylatoxin, using this name in lieu of serotoxin of Doerr, Jobling and Petersen, and Wells, or proteotoxin of Zinsser and Dwyer. The technics of Novy and Kruif and of Friedberger are described, and the antigen-antibody-complement reaction *in vitro* is described. The methods of demonstrating anaphylatoxins without specific antibodies and by Abderhalden's reaction, with bacteria and with trypanosomes, with animal bacteria with plasma instead of serum, *in vivo*, from toxins, and from peptone, are described. The physico-chemical and the biological characteristics of anaphylatoxin are reviewed and their action on isolated organs of sensitized animals is described. Toxicity is acquired by serum after centrifuging out an admixture with kaolin, after exposure to minimal amounts of agar, after mixing with starch paste which leaves in suspension in the serum colloidal starch particles, after shaking with chloroform or ether, and after dilution with distilled water. Various theories of the source and method of origin and the chemical nature of anaphylatoxin are enumerated but none are free from difficulties. The authors express the hope that this review of the problems, largely still unsolved, of anaphylatoxins will stimulate efforts to solve them.

C. A. KOFOID

The First Two Years: A Study of Twenty-Five Babies. Volume II—Intellectual Development — By Mary M. Shirley. Minneapolis:

*University of Minnesota Press, 1933.*  
513 pp. Price, \$3.00.

A study of the development of 25 babies during the first 2 years of life has been made. Volume II gives a detailed account of the intellectual development. Volume I, published in 1931, considered the postural and locomotor development. Volume III, to be published in 1933, will take up manifestations of the development of personality. This study is interesting in that it consists of weekly observations or tests made in the homes instead of in a laboratory.

This volume is divided into 3 parts:

*Part I* reports on the sequence of development in:

(1) Eye coördination; (2) Fine motor skills; (3) Speech; (4) Social habits; (5) Comprehension.

*Part II* gives detailed descriptions of the methods of examining or testing the babies.

*Part III* attempts to summarize all of the bits of behavior developed into a meaningful whole. Here the author concludes that behavior development follows a consistent sequence in all babies and that this development proceeds in harmony with biological laws.

The book is well written, and the material is presented in an interesting manner.

ELDRED V. THIEHOFF

*The Tides of Life: The Endocrine Glands in Bodily Adjustment—*  
*By R. S. Hoskins. New York:*  
*Norton, 1933. 352 pp. Price, \$3.50.*

In view of the marked interest of the public in the progress in endocrinology and because of the many spurious claims made by those who are seeking to use this interest as a means of personal gain, this volume is a most valuable addition to the library of the intelligent layman. The book is doubly valuable because of the author's investigation in this field of physiology. He does not try to discuss the technical details of the subject which in a volume written essentially for lay consumption would be out of place. The facts are given in non-technical language and where technical terms are used, full explanation is given.

The subject matter is discussed first from the standpoint of the hormones in general as the chemical regulators of the body, with a brief history of the growth of the subject. Following this the author takes up the various glands in order with their function and their relationship to each other as far as is known at the present time.

Besides devoting considerable space to some of the more recent developments in our knowledge of the sexual functions, the author also discusses endocrine dysfunctions such as diabetes, and the motor and secretory functions of the digestive tract which are not generally treated of in textbooks on endocrinology.

The book is well written and should appeal to a large group of the intelligent population.

MAZÏCK P. RAVENEL

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**The Ups and Downs of Rheumatic Fever**—The declines in incidence of rheumatic fever seen in certain New York hospitals from 1897 to 1919 and its increase since then is discussed from the angles of foci of infection, cycles of virulence, rainfall and economic conditions.

DAVIS, J. S. Incidence of Rheumatic Fever in New York City Hospitals. *Am. J. M. Sc.* 186, 2:180 (Aug.), 1933.

**More About Dental Caries**—Is tooth enamel a vital substance? It appears to increase in hardness, it is stainable, calcium seems to be extracted in pregnancy, but the author presents evidence which suggests that enamel is an inert substance. The corollary offered is that we must combat caries by protecting the enamel from plaques of fermenting carbohydrates.

FLETCHER, J. Dental Enamel: Is It a Vital Tissue? *Pub. Health* 45, 12:396 (Sept.), 1933.

**How to Stop Outbreaks of Food Poisoning**—Prevention of food poisoning is proposed through three channels—supervision of food handlers, more complete food inspection service, and popular education in the means of avoiding dangerous foods.

GEIGER, J. C. and GRAY, J. P. Food Poisoning. *J.A.M.A.* 101, 13:975 (Sept. 23), 1933.

**Advances (?) in Cancer Control**—"No marked progress has been made in instituting surgical treatment in the course of malignant disease of the breast. The present clinical methods are inadequate to detect malignancy until it is fairly well advanced." This gloomy beginning to the summary of an excellent paper on cancer of the breast emanating from the Mayo Clinic

would provide food for thought for health workers.

HARRINGTON, S. W. Diagnosis and Treatment of Lesions of the Breast. *Am. J. Cancer* 19, 1:56 (Sept.), 1933.

**Tonsillectomy and Immunity**—Tonsillectomy has no marked effect on the susceptibility to scarlet fever within 6 months, conclude the authors who Dick-tested the tonsillectomized children "before and after."

KERESZTURI, C. and PARK, W. H. Effect of Tonsillectomy on the Development of Immunity to Scarlet Fever. *J.A.M.A.* 101, 10:764 (Sept. 2), 1933.

**Finding Tuberculosis in Children**—Clearly presented is this outline of the program for detecting tuberculosis in childhood, which the author concludes is well worth the effort, difficult as it is. The details of this community case-finding program are set forth in a committee report published this month by the National Tuberculosis Association entitled "Procedure for the Discovery and Care of Tuberculous Children." An eminently sound proposal which should be known to all health workers.

KLEINSCHMIDT, H. E. Tuberculosis in School Children. *Pub. Health Nurs.* 25, 9:474 (Sept.), 1933.

**How to Overcome Fatigue**—This exposition of the physiology of sleep is so readily comprehensible that it seems much too clear and plausible to be entirely true. Its lesson should be taken to heart by all workers in health.

LAIRD, D. A. Fatigue. *Am. J. Nurs.* 33, 9:835 (Sept.), 1933.

**When Children Grow**—Statistically significant differences in annual weight increments are observed in young children living under normal conditions. In

this 8-year study, 1924 was a poor year while 1926 was the best. Guessing the reasons should prove a fertile field for cogitation.

PALMER, C. E. Variations of Growth in Weight of Elementary School Children, 1921-1928. *Pub. Health Rep.* 48, 33:993 (Aug. 18), 1933.

**Pros and Cons of Poliomyelitis Prophylaxis**—Balance and tolerance mark this discussion of the prophylactic treatment of poliomyelitis cases. Although there is no proof of the efficacy of adult and convalescent sera after the manifestations of the preparalytic stage,

we should not be deterred from further attempts to help cases with antisera.

WESSELHOEFT, C. The Present Status of Serum Treatment in Acute Poliomyelitis. *J. Pediatrics* 3, 2:330 (Aug.), 1933.

**Will Sterilization Prevent Mental Deficiency?**—Casting doubts on many of the benefits that proponents claim will follow sterilization of mental defectives is a favorite sport. These doubts are well cast in so far as most of the named premises and conclusions are concerned.

TURNER, F. D. Mental Deficiency and Sterilization. *Med. Off.* 50, 12:121 (Sept. 16), 1933.

## BOOKS RECEIVED

BEHIND THE DOCTOR. By Logan Clendening. New York: Knopf, 1933. 670 pp. Price, \$3.75.

OBSTETRICAL NURSING. Third edition. By Carolyn Conant Van Blarcom. New York: Macmillan, 1933. 651 pp. Price, \$3.00.

REPORT TO THE UNITED STATES GOVERNMENT ON TUBERCULOSIS WITH SOME THERAPEUTIC AND PROPHYLACTIC SUGGESTIONS. By S. Adolphus Knopf. New York: National Tuberculosis Association, 1933. 59 pp. Price, \$1.15.

THE VISUAL FATIGUE OF MOTION PICTURES. A World-Wide Summary and Survey. Compiled and Edited by Aaron E. Singer. New York: Amusement Age Publishing Co., 1933. 48 pp. Price, \$1.00.

I GO NURSING. By Corinne Johnson Kern. New York: Dutton, 1933. 256 pp. Price, \$2.50.

HYPH-CHLORINATION OF WATER. A New Answer to Some Old Problems. By Walter L. Savell. New York: Mathieson Alkali Works, 1933. 72 pp. Free.

THE GREAT DOCTORS. A Biographical History of Medicine. By Henry E. Sigerist. New York: Norton, 1933. 436 pp. Price, \$4.00.

A SHORT HISTORY OF DENTISTRY. By Lillian Lindsay. London: John Bale, Sons and Danielsson, Ltd., 1933. 88 pp. Price, \$1.25.

CHILDREN'S SLEEP. Motion Pictures and Youth Series. By Samuel Renshaw, Vernon L. Miller, and Dorothy P. Marquis. New York: Macmillan, 1933. 242 pp. Price, \$2.00.

OUR MOVIE MADE CHILDREN. By Henry James Forman. New York: Macmillan, 1933. 288 pp. Price, \$2.50.

A PRACTICAL MEDICAL DICTIONARY. 12th ed., rev. By Thomas Lathrop Stedman. Baltimore: Wood, 1933. 1256 pp., illustrated. Price, \$7.00. Thumb indexed, \$7.50.

A SOCIOLOGIC SCORE SYSTEM FOR THE CARE AND TRAINING OF CHILDREN. 11th ed., rev. By G. Hardy Clark. Long Beach, Calif.: Seaside Printing Co., 1933. 78 pp.

FOOD, NUTRITION AND HEALTH. 3rd ed., rewritten. By E. V. McCollum and J. Ernestine Becker. Baltimore: published by the authors, 1933. 146 pp. Price, \$1.50.

LET'S OPERATE. By Roy H. McKay and Norman Beasley. New York: Long & Smith, 1933. 361 pp. Price, \$3.00.

BUSY CHILDHOOD. By Josephine C. Foster. New York: Appleton-Century, 1933. 303 pp. Price, \$2.50.

HAPPY CHILDHOOD. By John E. Anderson. New York: Appleton-Century, 1933. 321 pp. Price, \$2.50.

HEALTHY CHILDHOOD. By Harold C. Stuart. New York: Appleton-Century, 1933. 393 pp. Price, \$2.50.

A STUDY OF RURAL PUBLIC HEALTH SERVICE. Edited by Allen W. Freeman. New York: The Commonwealth Fund, 1933. 236 pp. Price, \$2.50.

THE INSTITUTE FOR CHILD GUIDANCE, 1927-1933. By Lawson G. Lowrey and Geddes Smith. New York: The Commonwealth Fund, 1933. 116 pp.

## NEWS FROM THE FIELD

### NATIONAL CAMPAIGN RALLY FOR PRIVATELY SUPPORTED WELFARE WORK IN CHICAGO

OCTOBER 30 was the day set for the national campaign rally in Chicago of all communities raising funds for welfare work. One hundred and two cities between that date and November 20 will go out to raise \$53,651,210, according to an announcement made by Newton D. Baker, chairman of the 1933 Mobilization for Human Needs.

Large cities putting in welfare campaigns within this period are Chicago, Ill., with a goal of \$4,000,000; Cleveland, Ohio, \$3,985,000; Detroit, Mich., \$3,000,000; Kansas City, Mo., \$1,300,000; Los Angeles, \$2,954,648, and San Francisco, Calif., \$1,945,000; Minneapolis, Minn., \$1,650,000; Philadelphia, \$6,000,000, and Pittsburgh, Pa., \$2,500,000; New York, N. Y., \$8,600,000.

Mrs. Franklin D. Roosevelt, chairman of the National Women's Committee of the Mobilization, will preside at two of the large sessions.

Speakers on the program include Mrs. Franklin D. Roosevelt, Miss Jane Addams, Newton D. Baker, Harry L. Hopkins, Federal Relief Administrator, and John Stewart Bryan, president of Community Chests and Councils.

### ANNUAL SAFETY CONGRESS

SOME 5,000 safety delegates met in Chicago early in October at their 22nd Annual Safety Congress and Exposition to formulate plans for the prevention of accidents in all fields during the coming year.

The following officers of the National Safety Council were elected during the Congress:

President, John E. Long, The Dela-

ware and Hudson Railroad Corporation, Albany, N. Y. *Managing Director*, W. H. Cameron, Chicago, Ill. *Treasurer*, W. E. Worth, International Harvester Co., Chicago, Ill.

### ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

AT the annual meeting of the Association of Military Surgeons of the United States, held in Chicago September 25-27, Major General Harry L. Gilchrist, of the U. S. Army, was elected President. He will assume office as President of the Association January 16, 1934.

### WELLCOME PRIZE AND MEDAL

THE Wellcome Prize, consisting of \$500 and a gold medal, for 1933 was awarded to Major Edgar Erskine Hume, F.A.P.H.A., Librarian of the Army Medical Library, Medical Corps, U. S. Army, for his essay "The Value of Studies in Health and Sanitation in War Planning."

### CONNECTICUT PUBLIC HEALTH ASSOCIATION

THE Connecticut Public Health Association met on September 28, in Charlotte Hungerford Hospital, Torrington, Conn., where some interesting papers were presented. The attendance was 230, and the state was widely represented. Dr. Buck, of the A.P.H.A., spoke on the Chamber of Commerce Health Conservation Contest.

### NATIONAL NEGRO HEALTH WEEK CONFERENCE

THE Annual Conference of the National Negro Health Week, sponsored by the National Negro Health Movement, was held October 25

in the auditorium of the new building of the U. S. Public Health Service, Washington, D. C.

#### NEW YORK SEWAGE WORKS ASSOCIATION

THE New York State Sewage Works Association had its fall meeting at White Plains, N. Y., October 27-28. Papers were read by Lawrence Luther, W. J. Scott and W. W. Young.

#### HEATING AND VENTILATING EXPOSITION

THE Third International Heating and Ventilating Exposition sponsored by the American Society of Heating and Ventilating Engineers, is to be held at Grand Central Palace in New York, February 5-9, 1934.

Air-conditioning will be especially featured, as will refrigeration in its relation to the conditioning process and equipment.

#### DEATH

J. WALDO SMITH, member A.P.H.A., noted consulting engineer who built New York City's \$185,000,000 Catskill water supply system, died October 14. He was 72 years old. He was well known for the construction of a 14-foot tunnel under the Hudson River, through granite at 1,114 feet under sea level, to complete the aqueduct for bringing water into the city from the mountains.

#### PERSONALS

MINNIE STROBEL, member A.P.H.A., has resigned as secretary of the Missouri Public Health Association. Ross L. Laybourn will serve as secretary.

DR. MAYSIL M. WILLIAMS, member A.P.H.A., formerly director of the division of child hygiene in the North Dakota State Department of Public Health, has been appointed State Health Officer. She succeeds Dr. Arthur A. Whittemore, member A.P.H.A. The appointment was made by the Public Health Advisory Council, a new body created by recent legislation.

DR. W. W. COUNCIL, member A.P.H.A., of Juneau, Alaska, has been appointed Health Commissioner of the Territory of Alaska, succeeding Dr. Harry C. DeVigne.

#### CONFERENCES

November 3, Mid-year Meeting of the New York State Association of Public Health Laboratories, Albany, N. Y.

November 13, Southern Branch, A.P.H.A., Richmond Va.

November 14-18, Southern Medical Association, Richmond, Va.

February 5-9, 1934, Third International Heating and Ventilating Exposition, Grand Central Palace, New York, N. Y.

Spring, 1934, Statistical Conference, International Statistical Institute, London, England.

March 29, 30, 1934, Annual Meeting of the American Association of Pathologists and Bacteriologists, Toronto, Ont., Canada.

April, 1934, Southeastern Section, American Water Works Association, Augusta, Ga.

May 9-12, 1934. Sixty-sixth Annual Meeting of the Dental Society of the State of New York, Buffalo, N. Y.

July 24-31, 1934. Fourth International Congress of Radiology, Zurich, Switzerland.

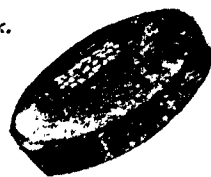
1935, International Congress on Mental Hygiene, Paris.

## ● SHAMPOO

Once a Week!

"BUT USE DERBAC"—doctors, nurses and public health authorities advise. Used with Special Metal DERBAC Comb, DERBAC (silver package) has been for years the proved remedy for dandruff and pediculosis. Use Gold Package for general shampooing. Send 10c for 25c-size professional cake (10 shampoos). CEREAL SOAPS CO., INC., Dept. A-11, 334 E. 27th St., New York.

**Derbac**  
Speed  
SHAMPOOS



# American Journal of Public Health and THE NATION'S HEALTH

---

Volume XXIII

December, 1933

Number 12

## The Physician and Public Health Officialdom\*

MORRIS FISHBEIN, M.D.

*Editor, Journal of the American Medical Association, Chicago, Ill.*

THE physician is, for most people, still the key-man in all matters affecting health. From the earliest times he has offered, for those whose confidence he held, the last word concerning death and disease. The aphorisms of ancient sages invariably affirm this fact. The texts of Hippocrates are as much concerned with the prevention of disease as with its diagnosis and treatment.

The vast majority of medical practice is individual. It concerns the diagnosis and the treatment of ailments which affect the individual human being. Perhaps the outstanding fear in relationship to disease is the fear of pain. Pain is a subjective sensation affecting individuals and not masses of men. Before the bacteriological epoch in medicine physicians were little, if at all, concerned with disease as it affects masses of mankind. However, the establishment by Pasteur of the germ causation of disease brought to light knowledge of the dissemination of infectious disease. This new information took the preven-

tion of some infectious diseases out of the hands of the physician and placed it in the hands of the community. This was logical, since it was by and through the community that the disease was spread, and since it was more feasible to prevent disease by and through the community than through the individual.

A large part of this problem has, of course, been associated equally with the change from rural to urban methods of living. The individual who lives alone; who obtains his food from the soil surrounding his cabin, his water from a deep spring at his door; and whose only contacts are with the members of his own family, is less likely to suffer contagious or infectious disorders than the one who is housed in one of these great barracks, called by courtesy "apartment houses," who obtains his milk from a farm hundreds of miles away, the milk having passed through the hands of innumerable carriers and processors before it reaches him; who travels daily to his office in a crowded public conveyance; who seeks his amusements in crowds of thousands in movies and tens of hundreds of thousands in baseball and football games; and whose food comes from four corners of the world,

---

\* Read before the Health Officers Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.



through the hands of many men. Such an individual is constantly affected so far as disease is concerned by his contacts with those about him.

Thus new knowledge of infectious diseases and their modes of transmission has emphasized the work of the public health official. Health departments became at once responsible for pure water supplies and pure milk supplies, for the disposal of sewage, for the control of foods, and for the study and control of food handlers. The development of the knowledge that tuberculosis might be spread by contaminated sputum spread carelessly about in public places, the knowledge that water from a contaminated well might bring on in the community a devastating typhoid epidemic, the knowledge that an infected milk supply might mean thousands of cases of septic sore throat, made the public aware of the fact that it needed the protection of its health against careless and irresponsible members of the community. Health officials were given police powers for controlling those who too lightly carried their individual responsibilities. Most of us can remember the time when the public health official was more a policeman than a scientist; when he travelled about with a club and a star forcing the closing of wells, forcing the straining and pasteurization of milk, forcing isolation and quarantine for infectious diseases.

Gradually, in connection with the development of our knowledge of immunity, came the possibility of immunization against infectious diseases of various types. Before immunization could be applied on a mass scale to human beings, it became necessary to teach them the importance and significance of these measures. The campaign for vaccination against smallpox, the first of the important measures for immunization, was not difficult in its early stages, primarily because the vast

majority of human beings feared smallpox more than any possible results that might come from vaccination. Fear is for most human beings a compelling motive. Once the nations of the world realized the value of vaccination against smallpox, it was not difficult to obtain in most countries legal measures to make vaccination against smallpox compulsory. It is perhaps significant that in the United States today our incidence of smallpox, because of the number of the unvaccinated, is far greater than that of many other civilized countries. The reason lies no doubt in the fact that smallpox has been brought largely under control by rather general vaccination and compulsory quarantine. There are philosophers among us who feel that it might be worth while to relax our efforts temporarily in order to strike fear again into a generation that is unaware of the lesson of the past. In times of epidemic when fear again strikes a community, it is not difficult to secure vaccination of vast numbers of people, whether by officials of departments of health, by industrial physicians, by school physicians, or by individual practitioners.

There are, however, new procedures in immunology of which the public is not yet aware. One of the problems of those interested in public health including both physicians and the public health officials is the means of impressing on the people the importance of immunization. Coincidental with the rise of our knowledge of the prevention of disease has come a tremendous advance in methods of educating the public. The travelling quack of an earlier day would speak at night to a few hundred people who surrounded his wagon on some city lot. In the course of some years he might have visited several hundreds of cities. The charlatan of today is bound by no such limitations. He reaches his public through all the means of dissemination of

knowledge that have been developed—the radio, the newspapers, the periodical, the direct-by-mail circular, the public address, and similar devices. These enable one who has a message to reach millions of people at a single time. Many officials in the field of public health have learned to avail themselves of these devices for the education of the public. For this purpose also new methods of education have been developed. The demonstration clinics are a practical lesson in medical methods. Their purpose is to educate the public in the value of some method in order that thereafter the public may go directly to the medical profession to obtain such service.

Whereas the prevention of disease two centuries ago was a matter between the physician and his patient, today the prevention of disease is a tremendous industry embracing the services of hundreds of thousands of persons, embracing knowledge derived from all of the special branches of science known today. The engineer, the biologist, the laboratory diagnostician, the educator, the physician, the physicist, and the chemist, all combine to make available information from their sciences for the public good. When such coöperative knowledge is required there must obviously be some center as a common meeting place, some headquarters for the placing of apparatus and materials, some executive head for coördination of effort and application of results. This obviously is the public health office of today. It would be apparent to anyone that the individual physician cannot in every community undertake to make available for disease prevention and its control all of the services that have been mentioned. The duty of the public health official in this connection is clear.

Where then does the cleavage come? How are the duties, the obligations and the prerogatives of the physician in the field of public health to be separated

from those of public health officialdom?

It is conceivable that a complete application of the mass handling of man might make it possible, even though not desirable, that all of the care of the sick and the prevention of disease among the well, be turned over to some official authority. This, which would represent the complete application of state medicine, is, I believe, recognized by all but a few fanatical adherents of the handling of men in a mass to be a most undesirable situation—one likely to result in nothing but ill for the human race. As long as human beings have individual minds and individual bodies with different constitutions, their happiness will not tolerate any such total disregard of their individualities. However, as has already been shown, there are certain aspects of disease prevention which the individual cannot undertake for himself and which must inevitably be assumed by public authority.

The family physician is so called because he concerns himself with keeping intimately in touch with all of those aspects of the lives of his patients in their families that may be concerned with health and disease. More and more emphasis is being placed on constitution and heredity as significant factors in the incidence of disease. It is known that man's resistance to disease depends as much on the quality of his constitution as on his opportunity to come into contact with infection. It is known that there are many disorders which tend to appear in families, of which no doubt the allergic and arthritic types of disease represent the most frequent forms. It is known that some families tend to be hypertensive, all having high blood pressures, and other hypotensive. The physician who has cared for grandparents and for parents knows what to anticipate in the children. The physician who has himself witnessed the birth of a child, who has

followed it through the first year of life, knowing the manner of its feeding and its nutrition; the physician who has taken the child through the various vicissitudes of childhood and adolescence, including all of the common contagious diseases; is far better able to judge the severity of the diseases that come on in middle life than one who sees his patient for the first time.

Many a physician today continues to combine those functions of priesthood and healer which were combined in the vocation of physicians in prehistoric times. Why then should any public health officialdom attempt to take from this family doctor the responsibility for individual prevention of disease that resides in the administration of preventive vaccination against smallpox, preventive inoculation against diphtheria or scarlet fever, or any of the other infectious diseases? Why suggest, as has already been done, that periodic physical examinations are best made by health departments or commercially organized groups? Why should public health officialdom assume that it is better to have children examined prior to their entrance into school in a large clinic under the supervision of the clinic head, or in a school clinic under the supervision of a salaried employee, than in the office of the individual physician? The cursory examination made available in such mass application of the ideals of preventive medicine cannot begin to compare in efficiency or in usefulness for prevention of disease with the type of study made by the individual physician in his office or in the patient's home. Obviously the factor which most concerns the socially minded leaders in the field of public health is the factor of expense. Public health officialdom recognizes that it is possible to examine a large number of children routinely at a smaller expense than the same procedure would cost if made in the physician's office. Nevertheless,

even though the individual examination costs more, it is worth more. Further, the more that such procedures are delegated to official agencies, and the more people come to believe that medical care in whole or in part is the function of the state, the sooner will we approach that period when an attempt will be made to delegate all medical care to state agencies.

No doubt the charge that is frequently made that it has been necessary for public health officialdom to take over the field of preventive medicine because physicians have neglected this aspect of their work, is made with some foundation. During the period of inflation, in the seemingly golden years of 1928 and 1929, few physicians were greatly concerned with problems of preventive medicine. When urged to examine the well, they were likely to say that practically all of their time was occupied with the care of the sick. It is reasonable to believe, however, that one of the benefits of the present period of financial depression is the realization in the minds of most physicians that they must practise preventive medicine increasingly in the future if they are not to lose the practice of curative medicine. Physicians of the past have been too readily content to leave all of the practice of preventive medicine to public health officials and to take it for granted that the duties of the public health department were being satisfactorily performed.

It is an aphorism that the bureaucrat invariably grasps more and more in the way of duties and obligations, knowing that his advancement depends largely on the expansion of his office. Thus when money is available the budgets of bureaus of all types expand constantly. It is with the greatest of difficulty that they are decreased in times of financial depression. Here again the financial depression may be said to have resulted in beneficial effects

in that it caused most public health officials to take account of their budgets, to study the expenses of their departments, and to limit their services to well established, essential public health procedures which could not be properly handled in other ways.

As budgets began to be restricted, public health officials began to discontinue many of the proper functions of the medical profession which they had taken over. Some exuberant child welfare departments fell by the wayside; school clinics for treating disease and for removing tonsils and adenoids in wholesale lots, began to disappear; house-to-house canvasses for all sorts of interesting investigations were temporarily postponed. More and more public health officials began to depend on their educational functions to enlighten the public as to the possibilities of preventive medicine, and to urge people to go to their family physician for such individual preventive medicine as these family physicians could well practise.

While it was no doubt the exigencies of the situation that compelled many public health departments to modify their functions in this manner, some enlightened health commissioners had already foreseen the possibilities. In Detroit particularly, Vaughan had realized the necessity of drawing the physician more and more into public health work. Today the so-called Detroit Plan is being accepted by both physicians and public health officials as probably the ideal method for securing a coöperative effort leading to the control of a specific infectious disease. Briefly, the plan inaugurated in Detroit in 1928 involves the participation of the general practitioner in public health procedure. Under this plan, patients are urged to go to their own doctors for preschool examinations and for immunization against diphtheria; and funds are paid from the health department to individual physicians for carry-

ing on this preventive medical work. Among the beneficial outcomes have been the reduction of diphtheria to one-fourth the incidence prior to the campaign, a changed attitude of the public toward the health department, and elimination of much antagonism by the medical profession toward the work of employees of the department of public health.

The plan has provided an opportunity for the general practitioner to review his knowledge of infectious disease and to obtain additional information through postgraduate conferences with health officials on the control of communicable diseases. By this enlistment of coöperation the office of every physician is made an educational center, a place to which mothers may come in order to obtain simple inoculation against diphtheria, but in which at the same time they learn the value of physical examinations, the importance of taking care promptly of preventable defects, and the significance of proper hygiene and nutrition. Perhaps, most important of all, people may thus be impressed directly with the desirability of having early competent medical advice in care of all types of disease.

Throughout the country there are many physicians who already have realized the importance of such preventive medical activities on the part of the family practitioner. Thus in Maryland one family doctor requested and secured from the Health Department the printed literature and forms designed to assist in teaching parents the necessity for diphtheria prevention. In 8 months he completed toxoid inoculation of a total of more than 180 children in his own family practice, and at the time of writing had given the first dose to 95 more children. During the same period other physicians had inoculated 526 children according to the records of the department.

In these times it would be well if

every leader in the field of public health would ponder carefully an address made by Sir Josiah Stamp, an eminent British authority in the field of economics to a recent congress on economic problems. He concerned himself with the "Economic Test of the Limits of Public Health."<sup>1</sup> After all, the money available to any community for public health purposes must be balanced against moneys needed for other causes. So intimately is health bound up with food, fuel, housing, safety and similar problems, that every executive and administrator must consider all of these objectives in apportioning the items in his budget. A free clinic for the treatment of venereal disease is no doubt a handsome appurtenance to every civilized community, but everyone will grant that the feeding of starving children should take precedence. Daily sprinkling and sweeping of all city streets would be esthetically desirable even though impossibly costly, but bacteriologic control of water supply and sanitary disposal of sewage are absolutely necessary for the continuation of life. A radio in every room in the hospital will help to free the hours from care for a good many sick people, but if the employment of a radio technician, and the purchase and upkeep of the equipment takes the place of providing a resuscitation apparatus in the operating room, it may well be avoided.

A distinguished leader in the field of public health has urged that it is uneconomic to turn over any of the functions of full-time health departments to medical practitioners. Nevertheless, one must in these times of stress and turmoil reevaluate all types of public service. The medical profession is reevaluating the methods and procedures used in the diagnosis and treatment of disease with a view to limiting their practices to the items that are essential. Similarly public health departments must reevaluate their services

to include the essentials so far as concerns prevention of disease among the public as a whole, and leave to the medical profession the practice of preventive medicine as it concerns the individual. Since the report of the Committee on the Costs of Medical Care has been gradually languishing into innocuous desuetude the trend of both preventive and curative medical practice has been toward greater individualization in the diagnosis and treatment of disease.

It is not only in the field of medicine that problems have arisen in these times relative to the manner of conduct of human affairs. Attempts are being made in every industry and business to bring some order out of the chaos into which the machine age, mass methods of living, and the work of the so-called efficiency engineers have brought us. Those who have witnessed at first hand the efforts that have been made during the last decade to bring out of the involved situation that exists in the care of the public health, some definite order, will recognize the necessity that exists for establishing more definitely the line of relationship between official and non-official health agencies and the medical profession. If one were at this time to seek the primary disturbing factor in the situation it would undoubtedly be the last mentioned group—namely, the nonofficial health agencies. One is concerned here as in the field of medical education with what has been aptly called "the curse of philanthropy." Since the time when the Rockefeller millions were first placed at the disposal of the International Health Board, medicine has been peculiarly the pet of philanthropy. In various surveys of philanthropies and foundations, this fact has been clearly established. Billions of dollars have been placed at the disposal of various funds and foundations for the investigation of problems in the field of medicine and for prevention of disease. It would be

unreasonable to conclude that all of this money has been wisely spent. Indeed it is possible to show beyond any shadow of a doubt that many millions of dollars have been wasted. Moreover, there is adequate evidence to indicate that meddlesome interference in the conduct of public health work by these nonofficial agencies has in some parts of the country completely disrupted public health departments; has brought about intense antipathies between physicians and public health officials who must obviously work in the closest harmony to secure the best results; and, on other occasions, has made the care of the public health a football of politics.

As has been said previously, much, if not the greater part, of our knowledge in public health during the last 50 years has been the result of movements initiated in communities by physicians and carried forward by physicians until the time when they had achieved sufficient force and volume to demand the creation of special departments or bureaus for their control. Many of the discoveries on which preventive work is based were contributed by physicians. Doctors conceived the antituberculosis movement; medical societies in many instances petitioned state legislatures for the creation of state boards of health; the medical profession has initiated in the past and continues to propose constructive legislation for the public health.

The medical profession has not been content with raising the standards of medical education, improving the quality of proprietary medicines, fighting quacks within its own ranks as well as without, and aiding in the development of the modern hospital; but has taken an active part in creating organizations, both governmental and voluntary, designed to improve the public health. Then, unfortunately, it has too often allowed these organizations to be-

come alienated from medical guidance and advice. In consequence, some workers in the field of public health have forgotten or overlooked the importance of the medical profession. They have designated themselves as specialists and their field of endeavor as a specialty, but they have failed to recognize that public health is a specialty of medicine. True, a well-rounded public health program requires nurses, engineers, technicians, and educators; but all these must be guided by underlying medical principles. Significantly, perhaps partly as a result of economic stringency, now that adequate budgets are hard to get and public services which have been regarded as essential because long established are threatened, workers in public health are turning back to the medical profession.

The medical profession has always stood, and still stands, in favor of public health work of the right kind, properly conceived, correctly organized, and competently directed, for the better health of the community. The medical profession does not feel obligated to endorse unwise, visionary, or inefficient projects merely because they are launched in the name of the public health. Because it does not hesitate to speak out against abuses, it has been unjustly accused of obstructing progress. But all motion is not necessarily progressive. In times of economic stress, public health work is of special importance. If epidemic scourges such as typhoid, diphtheria, yellow fever, malaria, and smallpox, held in check by preventive measures, were to be added to our financial difficulties at this time, the result might well be disastrous. The absence of epidemic plagues has been one of the principal contributing factors to low depression death rates.

The physician of the future must be increasingly a practitioner of preventive medicine. Obviously this involves new relationships to the public and to the

health official. Under various forms of state practice, problems have arisen which were discussed by Sir George Newman, K.C.B., M.D., F.R.C.P., chief medical officer of the Ministry of Health, who in his capacity as president addressed the Section on Public Health at the centenary meeting of the British Medical Association." He pointed out that in no previous age has there been such growth of the conception of preventive medicine as in the present era, paying tribute to Bright, Addison, Hodgkin, Gull, Jenner, Osler, Allbutt, and Barlow for the constructive service that has been rendered in the great march of preventive medicine by medical practitioners. "It is they," he said, "who have made the bricks, found the road, explored the facts, carried on the fight, and educated the people in a way of life." He elucidated further: "They searched into the circumstances of disease and related it to environment; they introduced medical notification and hospital isolation; by their investigation of factory conditions they initiated industrial welfare; they stemmed the rising tide of spirit drinking; they began the reformation of midwifery and were the first to attack the problems of child sickness and mortality; they established dispensaries and staffed the new hospitals; their systematic support of vaccination instituted the practice of immunity; and their scientific observation was the beginning of British epidemiology."

If one were to seek any gross division of obligations and prerogatives as applied to the relationship of the physician and public health officialdom to the problem of preventive medicine, the line of demarcation most apparent is that between procedures applied to the individual and those applied to the community. Problems of both preventive and curative medicine as they affect the indigent must perforce be community problems. Yet even these

may well be handled individually by physicians when they concern individual human beings, leaving it to the community, as is already done in many places, to provide the means. Under such a gross demarcation any form of preventive inoculation should logically be referred to the individual practitioner, except in times of epidemic when compulsory inoculation might have to be carried by the State. Under such a demarcation, periodic physical examinations, including not only the examinations of adults but also pre-school and school examinations of children, would also be assigned to the family doctor, whereas by contrast special examinations for industry, special examinations for army, navy or other public appointments, and the examinations of food handlers might well come within the purview of a department of health. Even in the case of food handlers, however, a suitable system of certification in which the employer would be made responsible for maintaining the good health of his employees might work out more satisfactorily.

As has been mentioned, isolation and quarantine, sewage disposal, control of milk, water, and food supplies generally, ventilation of public buildings, and all of those aspects of preventive medicine included under sanitary engineering, would come logically under the auspices of the department of health.

There is one aspect of the work of the departments of health which has been largely developed within the last 10 years and which must increasingly become a function of any well organized department. I refer, of course, to education of the public in elementary personal hygiene, education of the public as to basic facts in the diagnosis of diseases and the fundamentals of good medical care. Some of the departments of health in our large cities and some of the state departments of health which

are most progressive have already developed these functions to a point which constitutes an adequate demonstration of the merits of this phase of their work. On the other hand, a great many departments have lagged behind or have embarked on such amateurish attempts to utilize public education and information as to open themselves to ridicule by those competent in this field. Unless means are found for suitably educating and developing an adequate personnel for this purpose the time may yet come when great departments of health may find it necessary to engage the talent of advertising agencies, of writers and publicists, as well as other professional persons, to develop suitably this phase of their work.

It is significant that the American Public Health Association itself has

realized the importance of this new function, and that it has created special sections for their discussion in its annual sessions and a special department in its *Journal* for the promulgation of methods and ideas. It is obvious that the individual physician may be to some extent a competent educator of his individual patients, but it is equally obvious that he cannot carry daily and constantly to the vast majority of people the amount of health information that can be put forth by an active and competent department of health.

## REFERENCES

1. Stamp, Josiah, *The Economic Test of the Limits of Public Health*. *J. State Med.*, 41:505 (Sept.), 1933.
2. *Depression Death Rates*, editorial. *J.A.M.A.* 99:1354 (Oct. 15), 1932.
3. *Brit. M. J.* 2:190 (July 30), 1932.

## Children's Weight During Economic Disturbances

A STUDY on School Children in Hagerstown, Md., conducted (1) each year between 1921 and 1927, and (2) in May, 1933, gave the following results:

1. Average weight of children in the two periods presents no consistent or statistically significant differences.

2. The variability of body weight (measured by the standard deviation) is not, for boys, consistently different for the two periods. For girls, body weight is slightly more variable in 1933 than in 1921-1927.

3. In the totals of 1,245 boys and 1,269 girls weighed in 1933, there are 4 fewer boys and 41 more girls who are 12 per cent or more below average weight than would be expected had the same proportions been underweight as were found in the 1921-1927 period.

From these findings it may be concluded that there is substantially no change in the weight of boys, and a slight increase in the number of underweight girls, during the last few years of the economic depression.

Hagerstown is not representative of the most severely stricken type of community. It is a typical small urban community which is now suffering distinct, though moderate, economic disturbances and is fairly representative of communities in which 20 million people, or nearly 15 per cent of the population, live.—Carroll E. Palmer, M.D., Consultant in Child Hygiene, U. S. Public Health Service, *Pub. Health Rep.* 48, 12 (Oct. 20), 1933.



# Proposed Federal Food and Drugs Act Its Public Health Features\*

WALTER S. FRISBIE, F.A.P.H.A.

*Chemist in Charge of Coöperation, Food and Drug Administration,  
U. S. Department of Agriculture, Washington, D. C.*

IN order to appraise intelligently the health protective features of the legislation now before Congress, it is essential that they be compared with such features as are embodied in the present Federal Food and Drugs Act. Under this law, food is declared to be adulterated if it contain any added poisonous or deleterious substance which may render that article of food dangerous to health. The commerce in food which is deemed to be filthy, decomposed, or putrid, is also prohibited. The act further declares food to be adulterated if it is the product of a diseased animal or one that has died otherwise than by slaughter.

In the field of drugs and medicines, the health protection afforded may be said to be indirect rather than direct. The law requires that official Pharmacopœial and National Formulary preparations shall conform to those standards or be labeled to show wherein they differ. False and misleading statements as to the ingredients of drugs are prohibited, and therapeutic claims which are false and fraudulent make a violation. Cosmetics are subject to no regulation whatever at the present time so far as interstate commerce is concerned.

Turning now to the proposed new act, identified as S. 1944, and intro-

\* Read before the Food and Nutrition Section of the American Public Health Association, at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

duced by Senator Copeland last June, we find a number of very definite health measures not included in the present law. In the first place, all of the valuable provisions of the present law, whether from the health or economic viewpoint, have been retained. In the case of food, we find these supplemented, so far as public health is concerned, in the following particulars. Food is adulterated if it is or may be dangerous to health. Certain species of fish and some shellfish, such as mussels, are naturally poisonous, and a few varieties of beans, although generally foreign grown, contain dangerous amounts of a cyanogenetic glucoside. Such foods at the present time are not in violation of the act although obviously dangerous to health. The bill would give jurisdiction to the Department to regulate the type of containers used for food prohibiting such as might render the contents injurious to health.

As an example, we may cite the use of collapsible lead tubes for fish and cheese preparations, as well as the lead foil frequently used to wrap cheese, candies and similar articles. In the case of confectionery, resinous glazes and non-nutritive substances are definitely forbidden. The latter is of particular importance in view of the tendency on the part of certain manufacturers of novelty candies to incorporate metallic trinkets, marbles, coins, and similar articles to increase sales.

Some of these are made of lead and contaminate the candy even when the article itself may have been removed. Hard substances concealed or partially concealed are, of course, likely to injure the teeth or become lodged in the respiratory tract of children. A recent court decision averred that the present act does not forbid the addition of such substances to candy.

The present act is silent with respect to the sanitary conditions of establishments where food is prepared or manufactured for interstate shipment. The new bill states that food which has been prepared, packed, or held, under insanitary conditions whereby it may have been contaminated with filth shall be deemed adulterated. These sanitary provisions are supplemented by a special paragraph relating to conditions of manufacturing, of processing, and of packing. While the authority of this section extends to drugs and cosmetics, it is perhaps particularly pertinent in the case of food. The substance of this provision is to the effect that where conditions surrounding manufacturing, processing, or packing are such that the product may be injurious to health and its injurious nature cannot adequately be determined by objective examination, the Secretary of Agriculture is authorized to require such manufacturers or packers to obtain a permit. Such permit may be obtained only on compliance with regulations which the Secretary is authorized to promulgate. The period during which permit or licensed operations shall be required is optional with the Secretary, who is also authorized to suspend immediately any permit where the conditions of its issuance have been violated. There are certain operations in the food field to which this permit system is peculiarly appropriate.

This Association is fully aware of the repeated instances of food poisoning which have been traced to infected cream fillings, either cream puffs, chocolate

eclairs, or cream pies. In most cases, before the bacteriological evidence as to the causative agent has been obtained, the offending article of food has been distributed with probable increased incidence of food poisoning. A similar situation is reflected in the commercial preparation of fresh crabmeat, that is, fresh, cooked crabmeat, packed in containers which are not hermetically sealed and processed. Other varieties of shellfish may be subject to contamination either through polluted growing areas or as a result of insanitary preparation. The difficulty and delay incident to the confirmation of its dangerous character through objective examination is at once apparent. Where careless or indifferent methods are known to prevail in the handling of foods, such a permit system obviously constitutes a real public health safeguard.

It may also be of interest to mention the fact that the new bill provides for the use in foods of only such coal tar colors as have been certified by the Secretary of Agriculture. Especially noteworthy is the language of the section which provides for administrative findings of safe limits for such toxic substances as may unavoidably be present in food. The Secretary of Agriculture, after due notice and hearing, may either prohibit such substances or establish tolerances when he finds "that the presence of an added poisonous or added deleterious substance in or on food or cosmetics is or may be injurious to health, taking into account other ways in which the consumer or user may partake of or be exposed to the same or other poisonous or deleterious substances, . . ." In other words, the Secretary shall not only take into account the toxicity of the added substance, *per se*, but the probable effect of this ingredient after considering all of the other public health factors involved. The authority to establish

tolerances includes cosmetics as well as foods.

The adulteration of drugs is defined essentially as under the present act except in one very important particular. The terms of the bill declare a drug adulterated if it is or may be dangerous to health under the conditions of use prescribed by its label. There are certain drug preparations which are actually a menace to health when used without competent medical advice. At the present time such drugs may be sold if they are truthfully labeled and bear no false and fraudulent claims of therapeutic benefit. Not so long ago the death of a prominent and wealthy citizen of this country was widely heralded in the press as one due to the indiscriminate use of a radium salt preparation. The preparation was known to the Food and Drug Administration; was not improperly labeled; and its shipment in commerce was not a violation of the present law. Under the terms of the proposed bill it would be very definitely brought within the ban of the statute.

The misbranding of drugs is more specifically covered in the text of the proposed measure. Not only is the list of narcotic and hypnotic substances supplemented by the name with such products as the barbituric acid derivatives, paraldehyde, peyote, and sulphonmethane, but there is a further requirement that in addition to the name and proportion of such substances present the label shall bear the words "Warning—May be habit-forming." This section of the bill also authorizes the Secretary to supplement this list with such other substances as he may find to possess narcotic or hypnotic properties. If the labeling of a drug bears the name of any disease for which such drug is not a specific cure but only a palliative, it shall bear in immediate connection with the name and in equal prominence a statement that the drug is

not a cure for the disease named. In the case of drugs which are liable to deteriorate, the Secretary is authorized to prescribe regulations for the packaging of such articles and for labeling to show such precautions as may be necessary for the protection of public health. A preparation which is represented as a germicide, bactericide, disinfectant, or antiseptic, must be plainly and conspicuously labeled to show exactly the method and extent of application necessary to kill active microorganisms with which the preparation comes in contact.

The question of individual susceptibility both to foods and drugs has not been overlooked in the text of this bill. Among the paragraphs relating to the misbranding of foods is one which requires that an article of food for which no definition of identity has been adopted shall bear upon its label the name of each ingredient in order of predominance by weight, exempting the specific designation of the particular spice, flavor, and artificial color. Such informative labeling is of course valuable for discriminative purchasing but most important to advise those sufferers from various types of food allergy as to the definite character of such foods as are now sold under fanciful or foreign names without disclosing the presence of substances which are responsible for the appearance of untoward symptoms in such cases. Parallel provisions are to be found in the drug misbranding section. Under this proviso any drug other than a U.S.P. or N.F. preparation is required to show on its label its common name, if such exists, as well as the presence and amount of each medicinal or physiologically active ingredient, and if necessary for the protection of public health, the Secretary may prescribe further regulations for labeling. Here again is an additional safeguard afforded those for whom certain drugs are definitely contra-indicated.

A discussion of drug regulations

would be incomplete without calling attention to the definition for drug. At the present time, the term "drug" means all medicines and preparations official in the United States Pharmacopœia or National Formulary, or any substance intended to be used for the cure, mitigation or prevention of disease. The new bill carries the same definition but supplements it in two important particulars: First, to include with substances all preparations and devices for the cure, mitigation, treatment or prevention of disease, and, second, all substances and preparations other than food and all devices as well which are intended to affect the structure of or any function of the body. Such devices as electric belts recommended for various ills and such preparations as are now offered and guaranteed safely to slenderize the human form are at the present time outside the jurisdiction of the act and their regulation is only another step to safeguard the public health.

Since the present food and drugs act is silent with respect to cosmetics, it may be of interest to note that it is proposed to define this term to include "all substances and preparations intended for cleansing, or altering the appearance of, or promoting the attractiveness of, the person." A cosmetic will be deemed to be adulterated in two instances: (1) if it is or may be injurious to the user either under the conditions of use prescribed in the labeling, or under customary or usual conditions of use, and (2) if it bears or contains any poisonous or deleterious ingredient which is prohibited or which is in excess of the limit which the Secretary is authorized to prescribe.

All foods, drugs, and cosmetics are included in the sections relating to false advertising. An advertisement of any of these commodities is false if it is untrue in any particular, or by ambiguity or inference creates a misleading im-

pression, and the term "advertising" includes all representations of fact or opinion disseminated in any manner other than by labeling. All of the injunctions respecting the proper labeling of foods, drugs, and cosmetics apply with equal force to their advertisement. In addition the bill cites a list of diseases, including appendicitis, cancer, diabetes, nephritis, tuberculosis, and venereal diseases, where self-medication may be dangerous or contrary to the interests of public health, and for these the advertising of drugs is prohibited, except where such advertising is disseminated to members of the medical and pharmacological professions or appears in scientific periodicals. The public health significance of the control of advertising, particularly in the field of drugs, should be at once apparent. At the present time there is a long list of drugs which are shipped in interstate commerce, the labeling of which is not in violation of the present Federal Food and Drugs Act, but the same preparations are extravagantly advertised in the press or by radio with a complete disregard of the falsity of the claims made with respect to the therapeutic benefit promised sufferers of these various afflictions. The power and influence of advertising is readily conceded. When such advertising relates to the food which is necessary to maintain health and to the drugs which are expected to restore it, public welfare demands that the statements made in the public press and through the channels of the radio shall be free from misleading statements in the case of food, and false or fraudulent claims in the case of drugs.

Aside from the increased penalties which have been provided there are two more sections of interest. One relates to injunction proceedings which are provided in the case of repeated shipment in interstate commerce of adulterated foods, drugs, and cosmetics,

and for the continuous dissemination by broadcast or United States Mail of false advertising of these commodities. The other section relates to publicity, and authorizes the Secretary of Agriculture to disseminate from time to time any information he deems necessary in the interest of public health or for the prevention of fraud.

In this paper an attempt has been made merely to summarize the health protective features of this new legislation. The bill contains many other valuable provisions which are not to be found in the present act, all of which are in the interest of better consumer protection. The bill has been termed a consumer's measure; at any rate it has

been framed with that idea in mind. It should be of especial interest to public health officials and the Department has conceived that it has an obligation to acquaint such officials and through them, so far as possible, the consuming public with the steps which have been taken in their interest.

The Department of Agriculture, through the Food and Drug Administration, will coöperate to the fullest extent in acquainting you, and through you others who may be interested, with this legislation. It expressly desires that you give the Administration the benefit of your opinion, criticism and comment on this measure and what it purports to accomplish.

---

## Childbirth Benefits in the New Social Insurance Law, Rumania

THE law of April 8, 1933, consolidating and amending the social insurance laws of Rumania, contains much more generous childbirth-benefit provisions than the law of 1912 by which compulsory sickness insurance was first introduced in Rumania.

An insured woman is now entitled to a childbirth benefit of 50 per cent of her wages payable for 12 weeks, to treatment by a physician or midwife, and to the necessary medicines; whereas in the old law no medical treatment or medicines were provided in addition to the cash benefit, which was paid for only 6 weeks but could be extended for another 6 weeks if the woman nursed the child.

In addition to extending the duration of the childbirth benefit the new law provides a special benefit for a 6-week

period if the woman nurses the child.

Instead of the cash benefit the woman may be given treatment in a maternity clinic. During her stay in the clinic the cash benefit is discontinued, unless she is supporting her family; in that case one-half of the benefit is paid.

The new law provides for the uninsured wife of an insured man the same childbirth benefits as for a woman insured in her own right, provided her husband has paid his dues for at least 52 weeks in the preceding 2 years. If the financial condition of the insurance fund permits, the uninsured wife may be given in addition a cash benefit of 50 per cent of the sick benefit to which her husband would be entitled in case of illness.—*Monitorul Oficial*, Budapest, April 8, 1933; *Bulletin de l'Office International du Travail*, Basel, 1913.

# The Roentgenogram in So-Called "Acute" Silicosis\*

HOMER L. SAMPSON

*Director, X-Ray Laboratory, Trudeau Sanatorium, Trudeau, N. Y.*

THE recent literature contains several references to an acute form of silicosis. In dealing with a disease which is by definition chronic in its course, the designation "acute" is ambiguous, but it has been employed to indicate that the process develops within a period of a few months or years. It has been my privilege to examine a series of roentgenograms of persons said to be suffering from this condition. One set was from a small group of sand blasters and another from a group of colored laborers who had been engaged in the boring of a tunnel through rock of a very high silica content. Some of these persons have died and were autopsied. The pathological aspects will be illustrated by Dr. Gardner, while I will attempt to describe the roentgenograms in the living members of the group.

Before considering the roentgenological appearances of this disease, it is of prime importance to consider the roentgenologic technic. In an acute silicosis we would presumably be dealing with deposit in the lymphatics and regional lymph nodes of particulate matter which is capable of provoking an acute reaction in these tissues. We have reason to assume that in the early phase of the disease the physical changes in the lungs would be so slight that they would not produce recognizable shadows. To demonstrate such minute changes it is necessary to give especial

attention to the factors involved in the making of the roentgenograms. I do not hesitate to say that stereo-roentgenograms are necessary if we are interested in the early manifestations. With properly taken films, one can, in the interpretation, eliminate disturbing extrapulmonary shadows and also evaluate slight intrapulmonary variations due to movement. The X-ray tube should be of the line-focus copper-backed-target type, with a focal spot not greater than  $10/64''$ , the tube-film distance not less than 4' and the time of exposure (which should be carefully checked) not slower than  $1/10$  sec., or preferably  $1/20$  sec. Longer exposures permit of too much movement of the intrapulmonary shadows. Obviously there are many other factors which, if neglected, will make interpretation more difficult. These are too numerous to mention. Probably the most important is the blur due to screen-film contact and movement. All of these factors are specifically mentioned because of the fact that a larger focal spot, a longer exposure time, and a shorter distance, may produce variations in the shadows that can be very misleading.

In considering the very slight alteration in the pulmonary field which such insignificant anatomical changes produce, one must bear in mind certain manifestations of the normal chest: The movement of the pulmonary markings at the left base due to the heart beat may well be mistaken for the

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

cloudiness expected in early silicosis. Similarly the shadow of the margin of the pectoralis muscle is not unlike that shadow seen in cases of beginning fibrosis. However, the shadow of the muscle is situated more peripherally and continues beyond the pulmonary field while the intrapulmonary haziness of silicosis is usually more centrally located. Also, in the case of the pectoralis muscle the lung markings are visible through the shadow of the muscle, whereas the enveloping intrapulmonary infiltration produces cloudiness which tends to obscure the vascular ramifications. In general, if the cloudiness, which has not yet assumed the nodular appearance, is confined to the region of the pectoralis muscle or to the left base, and if no alteration of the pulmonary pattern is seen above this level, we may not be justified in believing we are dealing with a pathological process.

Of a large series of roentgenograms of miners who have been exposed to silica for varying periods of time, in general, the shadow changes in the roentgenogram increase with the length of exposure. Roentgenograms of a certain quality or character, that is, those in which there was loss of detail due to movement, or large focal spot, or short tube-film distance, or a too contrasty film, or a combination of these, may have such a shadow complex as to be mistaken for such pathological changes that take place before obvious nodulation has appeared.

After the stage of nodulation has been reached it is not difficult to recognize the characteristic mottling. If we are to be guided by experience in other acute pulmonary diseases, that is, pneumonia or pulmonary tuberculosis, we have reason to believe that in "acute" silicosis, serial roentgenograms taken at short intervals will or should show obvious changes in the shadows during the period of progression. Monthly roentgenograms should reveal

a rapid increase of shadows until the climax is reached, when the process should pass into the chronic stage, which form is now well recognized.

I think it might be postulated that if serial roentgenograms fail to reveal obvious, rapidly changing shadows, and by that is meant shadows changing from month to month or week to week, one is not justified from a roentgenological point of view, in considering a silicotic process as acute. Undoubtedly there are persons exposed to heavy concentrations of silica for short periods who exhibit various symptoms of acute disease, but the serial roentgenograms which I have seen did not confirm the diagnosis of uncomplicated silicosis.

At this juncture it is highly important to consider from a roentgenographic standpoint the presence of an infectious process superimposed upon a preëxisting silicosis, or *vice versa*. Here we have (according to the experimental work of Gardner) reason to expect reasonably rapid changes to take place in the processes. If the picture changes with extreme rapidity it is hard to conceive that these alterations are due only to the inhaled silica; it is more probable that one is dealing with a complicating infection.

In general, two types of this so-called infection picture were present in the roentgenograms studied: (1) that which resembled very closely the characteristic shadows of a pulmonary tuberculosis—in some instances even to the extent of having cavity formation and in which there was no diffuse nodulation; and (2) those which presented the above characteristic shadow-complex of a tuberculosis plus a diffuse nodulation. To this latter group might be added another type. A diffuse nodulation of a distinctly fluffy character—diffuse cotton ball appearance, unlike the longstanding nodulations of the non-infective group. The inferred infective process, in a few instances, was so advanced as

to make the interpretation of an associated silicosis uncertain. In not a few of those cases who probably had an infection it was not improbable that some had a degree of silicosis that was not yet recognizable by roentgen examination.

There is reason to expect, in any acute process, shadows of a rather characteristic nature. In practically all cases the one outstanding feature of the roentgen shadow complex is its cottony or fluffy appearance and its ill-defined margins. It is not to be forgotten that in the earliest phase of such processes, there may be no discernible shadow in the lung field. The cellular reaction may be sufficient to produce pronounced subjective symptoms, but for the time being there is not sufficient loss of air space to be recognizable on the roentgenogram. If the disease progresses this condition does not last long and the next roentgenogram of the series will show a change. I believe until serial roentgenograms reveal rapidly progressive or retrogressive shadows, and also the stigma of an infection be satisfactorily excluded, one is not justified in interpreting the roentgenogram as rapid uncomplicated silicosis.

Gardner writes "In most instances authors claim that fibrosis of the lungs

develops after a few short inhalations of dust over a period of weeks or months." Further he states that "in order to produce significant changes, animals must be exposed for periods measurable in years to concentrations of dust no heavier than those in the worst industrial condition."

In the rabbit it has been demonstrated that silicosis is a progressive disease. After 13 months of exposure the animals were set aside in a normal atmosphere. The resulting progressive changes that occurred were the development of proliferative nodules. No mention is made of acute silicosis.

Rabbits exposed to a high concentration of quartz dust for 13 months revealed at autopsy only many small proliferative nodules in and about the pulmonary lymphoid tissues. The X-rays revealed barely detectable shadows.<sup>1</sup>

There is one pertinent point, however, that needs to be cleared up before one can exclude the possibility of acute silicosis, and that is, in many cases apparently suffering from silico-tuberculosis or tuberculo-silicosis, tubercle bacilli are not demonstrated.

#### REFERENCE

1. Gardner, Leroy U. *J. Indust. Hyg.* Jan., 1932.



# Pathology of So-Called Acute Silicosis\*

LEROY U. GARDNER, M.D.

*Director, Saranac Laboratory for the Study of Tuberculosis,  
The Edward L. Trudeau Foundation, Saranac Lake, N. Y.*

DURING the past 3 years several reports of so-called "acute silicosis" have appeared in the literature. As far as can be learned Macdonald, Piggot, and Gilder<sup>1</sup> first used the term in a publication describing silicosis in young women employed for 4¼ years or less in packing soap powder. Gerlach and Gander<sup>2</sup> reported a similar condition in a German scouring powder plant and Chapman<sup>3</sup> described its occurrence in an American factory of the same kind. These cases all developed in young women who were said to have been exposed to excessive concentrations of silica dust although no counts of the atmospheric concentrations had been made.

However, the authors were more impressed by the fact that there was free alkali dust in the air of the working places (approximately 25 per cent of such powders are alkalies) than with the high silica concentrations. They concluded that since silica is soluble in an alkaline medium the inhaled material would quickly dissolve to form colloidal silica in the moist lung tissues, and as a result the connective tissues would respond by proliferation much more rapidly than is said to be the case when pure silica is slowly dissolved by the slightly alkaline body fluids.

Kessler<sup>4</sup> reported on a group of sand

pulverizers who were alleged to have developed silicosis after exposures as short as 4 months to 1½ years. These were young male negroes. It was stated that the dust concentrations were excessive although the actual figures are not available. The particles were very fine (1 to 5 microns in diameter) and over 99 per cent of them were free crystalline silica. In this group it was assumed that the rapid development of the silicotic process was due solely to the high concentration of dust in the atmosphere. Since the men had not been examined before employment in this plant, they might have had previous exposures to siliceous dust. If so, the silicosis from which they apparently suffered could not be considered acute.

The lack of complete data in these reports raises the question as to whether a chronic disease like silicosis, which in the majority of industries today requires at least 10 or 12 years for its development, and which under the very worst conditions in the past only became recognizable after 3 or 4 years, can under any conditions actually develop to a degree where it can be recognized in a roentgenogram in shorter periods of time. If it does occur, what is its character and what are the conditions responsible for the accelerated reaction? Two factors, the presence of free alkali in association with silica dust, and an excessive concentration of the silica itself, have already been suggested. A

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

third factor might be particle size, and a fourth, concomitant infection.

The author has had opportunity to study the lung tissues and in most instances ante-mortem roentgenograms from 15 persons who were said to have developed silicosis after dust exposures of from 8 to 17 months. Of these 9 were employed as laborers and drillers in a tunnel through practically pure quartz; 4 were sand blasters, and 3 were sand pulverizers from the same group reported by Kessler.<sup>4</sup> For the last group the occupational histories are most incomplete and probably inaccurate.

No atmospheric dust counts were available, but from all reports excessive amounts of extremely fine dust were generated in each case. In the tunnel, which was bored without effective ventilation, the men returned to the face immediately after blasting and were required to work with dry drills in an atmosphere so exhausted by gasoline engines that they must have breathed abnormally fast. Such conditions would obviously favor the inhalation of unusually large quantities of very fine dust. The sand blasters also were without effective protection; one man dated the onset of his symptoms from the bursting of a sand hose while cleaning the inside of a large tank. The sand was used over and over until it became so fine as to be no longer effective as an abrasive. In the pulverizing plant, where the sand used by the sand blasters was ground and bagged, there were protective devices but these were apparently not altogether effective. While this information implies excessive concentrations of extremely fine silica particles, the dust exposures cannot be measured quantitatively.

In none of the groups had there been any attempt to examine the men when they were employed. Therefore one is compelled to rely upon the occupational history obtained in all cases after the

development of alleged symptoms. Such information must be regarded with suspicion when claims for compensation are pending, as was the case with these individuals. Some of the information was obviously valueless, as in the case of a sand pulverizer with a roentgenogram showing widespread pulmonary disease, who had worked in the plant only 35 days. On the other hand, the age of many in these groups and the conditions under which they were hired precluded any prolonged exposure to silica in previous occupations. Five of the tunnel workmen were under 29; the others, with 1 exception, were under 40. Seven were negroes who claimed to have had no previous experience in mines. Two were white men who had been coal miners for 4 and 7 years respectively. The negroes were reported to be common laborers brought from another state under contract. Most of them were employed at times as drillers, an unusual occupation for unskilled laborers, but it was contended that professional miners would not work under the conditions existing in this undertaking. The sand pulverizers were also young negroes whose previous employment was unknown. The sand blasters were all white, aged 26, 27, and 45 respectively. This evidence for the shortness of the exposure periods is also obviously open to criticism, but even if the exposure was not so brief as claimed in some individual cases, nevertheless it could not have been as long as that in industries usually associated with a silicosis hazard.

Since information as to the exact character and duration of the dust exposure in these cases is so limited, the justification for this presentation might be questioned. Several reasons exist. In the litigation attendant upon the presentation of compensation claims many of these persons were alleged to be suffering from an "acute silicosis." With 3 exceptions these men died from

9 to 18 months after completing very short exposures to pure silica. Few autopsies have been reported upon persons dying during the course of such short, severe exposures and therefore these cases may shed some light upon the nature and extent of the silicotic reaction. While it is known that silicosis is a progressive disease, the amount of progression to be expected within so short a time after the exposures must be limited.

in many of the sections they are extremely numerous. The relative size of the nodules which had developed after various exposures could be more accurately measured. In a group of sand blasters working from 1 to 5 years the outline of the central hyaline portions of various nodules in micro-sections were drawn with a camera lucida. Figure I illustrates representative nodules from 4 different cases. After a 12 months' exposure the nodules measured from 0.3

TABLE I

Case No.	Age Color	Occupation	Exposure	Interval to Death	Silicosis	%SiO <sub>2</sub> Dry Lung	Infection	Organisms
63	W 23	Driller	Coal 7 yr. Tunnel 13 mo.	9 mo.	4+ (Anthracosis)	1.98	? TB	O
64	W 46	Laborer	Coal 4 yr. Tunnel 8 mo.	18 "	4+ (Anthracosis)	3.10	Acute and Chr. Non-TB. Pn.	Diplococci
65	C 29	Driller	Tunnel 9 "	15 "	4+	2.78	Caseous Pn.	TBC
66	C 24	Laborer	" 9-10 "	12 "	±	0.875	Caseous Pn.	TBC
67	C 21	"	" 9 "	14 "	+	1.975	TB. Br-Pn.	TBC
68	C 34	"	" 13 "	?	4+	2.77	TB. Br-Pn.	TBC
69	C 29	"	" 13 "	11 "	0	0.84	TB. with Cavity	O
70	C 38	"	" 13 "	13 "	2+	2.58	Cas. Pn. Cavity	O
71	C 37	"	" 13 "	13 "	4+	1.24	? TB	O
34	W 45	Sand blaster	Shop 17 "	21 "	5+	-	Unresolved Pn.	O
36	W 27	"	" 12 "	20 "	4+	-	TB. Pn. Cavity	TBC
47	W 26	"	" 15 "	15 "	3+	-	TB. Pn.	TBC
44	C 28	Sand Pulverizer	35 days?	?	3+	1.81	Caseous Pn.	-
45	?	"	?	?	3+	2.1	Aspiration TB	-
46	C 29	"	3 yrs?	?	3+	2.45	TB. Pn.	-

In all cases but 1 (No. 69) there is definite microscopic evidence of silicosis consisting of characteristic hyaline fibrous nodules. These lesions are definitely smaller but appreciably more abundant than those encountered in the usual run of silicosis cases known to have had more prolonged exposures to dust. It has not been possible to count the actual number of nodules in a given volume of lung tissue, as suitable quantities from corresponding parts of the different lungs were not available; but

to 0.4 mm. in diameter; by 5 years they had attained a diameter of 0.7 to 0.8 mm. In the intervening periods of 15 and 18 months there had been an appreciable increase in size. The nodules in the tunnel workers were approximately 0.4 mm. in diameter. For comparison a few nodules from the lung of a hard rock lead miner were projected in a similar manner. These nodules, too large for illustration, measured from 3 to 4 mm. in diameter. The tracings also demonstrated that all

culosis was probably the cause although this could not be definitely proved.

The most common lesion was a diffuse caseous pneumonia without definite tubercle formation. The air spaces were filled with necrotic exudate which in occasional areas could still be identified as consisting of a mixture of mononuclear and polynuclear leucocytes. In many instances the pulmonary framework and even the silicotic nodules were involved in the necrotizing process. Frequently great numbers of cholesterol crystal clefts were observed. (The cleft was formerly occupied by a crystal which was dissolved in the preparation of the section.) In 5 instances the tuberculosis occurred in small bronchopneumonic patches with caseation scattered here and there throughout the lung. Cavity formation was observed in 2 of these cases but in the other 3 only sections of the lung were obtained without record of conditions in the remaining portions. Tubercle bacilli were rare in all instances, and in some of the obviously tuberculous lesions none could be found.

There were 2 cases (Nos. 63, 71) in which the infectious process was presumably tuberculous but a definite diagnosis could not be made. The air spaces were filled with a partially necrotic exudate and some of the silicotic nodules had a central zone of granular necrosis but neither bacilli nor typical tuberculous lesions could be discovered.

The acute and chronic non-tuberculous pneumonias were interesting. One case (No. 64) occurred in a white man with 3 or 4 years' experience in a coal mine who showed extensive silicosis of the small nodule type and considerable anthracosis. In one lung the air spaces between the silicotic nodules were overdistended with an exudate consisting almost entirely of polynuclear leucocytes with numerous pneumococcus-like organisms; in the other there was organization with extensive interstitial fibrosis and an acute exudate in the distorted air spaces. The other case (No. 34), a more acute unresolved pneumonia also occurred in a white man, a sand blaster for 17 months. His symptoms appeared at the end of this period but he worked at another job in the same plant for 17 months more before he was forced to enter a hospital. He died 4 months later. The roentgenological and pathological diagnosis at this institution was silicosis complicated by tuberculous broncho-pneumonia and right heart failure. At first sight the sections did suggest an element of tuberculosis but further study has convinced the writer that the infection was not of this character. Silicotic nodules were

embedded in areas of massive fibrosis from which most of the air spaces had disappeared or were represented by distorted slits. Other less involved portions of the lung showed air spaces with thick walls and a mixture of acute and organizing fibrinous exudate in their lumina. In still other areas edema and passive congestion dominated the picture.

The gross appearances have not been described because they were uninformative. In only 8 of the tunnel workers was the author able to see the whole lungs and in them the tissue had already been fixed in formalin; from the remaining ones large blocks of tissue were available for study. In 7 of the group caseous tuberculous pneumonia was so extensive that it obscured any other lesion which might have been present. Careful search with a lens disclosed nodules not greater than 1 mm. in diameter which suggested a complicating early silicotic reaction in 2 instances. In 2 others the diagnosis was questionable. Had the occupational histories not been known, it is doubtful whether silicosis would have been thought of in any of them. Careful inspection of the apices of the lungs failed to disclose evidence of healed tuberculous lesions, and no calcified foci could be detected in the lymph nodes.

Dr. Clayton S. Smith<sup>5</sup> has analyzed portions of the lungs of the tunnel workers for silica. The complete details of his study are published elsewhere in this *Journal*, but he has permitted the author to summarize his findings in this report. He made separate analyses of various portions of each lung but in Table I his figures for each case have been averaged. The percentage of silica in the dried lung varied between 0.84 and 3.1. It was lowest in the case with no silicotic nodules (No. 69). A second case with very slight lesions (No. 66), showed only 0.875 per cent. In the others, with variable amounts of reaction, it ranged between 1.24 and 3.1, but the amount was not proportional to the period of

employment. The highest figure occurred in a man with 3 or 4 years' previous employment in a coal mine, but the other coal miner who worked 7 years at the same occupation showed less silica than most of the men exposed only in the tunnel. For the sand pulverizers Dr. Louis Gershenfeld furnished reports of analyses which showed from 1.8 to 2.5 per cent of silica in the dry lung tissue. The duration of employment reported for this group seems most untrustworthy.

#### DISCUSSION

It is indisputable that this group of workmen exposed in three different occupations to high concentrations of silica dust had developed the histological lesions of silicosis by the time of their death. Whether their exposures were actually as short as 8 to 17 months cannot be established with certainty, but their age would preclude any occupation of many years duration. Dr. Smith's analysis of the lung tissues of the tunnel men showed 1.24 to 3.1 per cent of silica in the dry weight of the lungs with histological lesions of silicosis. In the one man with no specific changes his figure was 0.84 per cent. For the sand blasters the corresponding figures varied from 1.81 to 2.45 per cent. These are as high as McCrae's<sup>6</sup> percentages for ordinary silicosis in South African gold mines. He does not state the duration of exposures in his report but the per cent of silica in 6 dried lungs varied from 1.39 to 4.47 with an average of 2.63. The precise amount of reaction which had developed at the end of the period of employment is unknown as no case came to autopsy at that time. All observations were made from 9 to 20 months later when the men had died of infection. Within this period some change in the lesions would be expected particularly in the presence of infection. The significant feature is that the

gross anatomical changes which had developed at the time of death were not sufficiently extensive or characteristic to be recognized as silicotic in origin.

Strictly speaking, the first question proposed in this investigation has been answered in the affirmative; silicosis can develop under these conditions of exposure but the reaction is of microscopic proportions. Since the men could not have been employed for very long periods because of their ages, and since chemical analysis showed that their lungs contained excessive amounts of silica, it must be assumed that this material accumulated within a comparatively short time.

The second question was whether the silicosis developing under such conditions in any way differed from the usual picture observed in miners, quarrymen, founders, etc. Direct comparison is impossible for lack of pathological material on men dying after short periods of employment in these industries. It is quite possible that the early lesions of the more familiar type of the disease are comparable both in rate of development and character to those described for this series of cases which had been called "acute." In the absence of any other basis of comparison for the rate of development of silicotic nodules, reference is made to animal experiments.<sup>7</sup> In guinea pigs exposed for from 1 to 2 years to concentrations of approximately 200 million pure crystalline silica particles per cubic foot of air, the number of nodules per unit area was much smaller than that in the human cases under discussion. After 1 year's exposure both were approximately of the same size but the human lesions were completely hyalinized, whereas in the animals this change was only beginning to appear. During the ensuing year the total area of the experimental nodule attained approximately the same size as the central hyaline zone in the nodule of the sand blasters and tunnel

men exposed for similar periods. Whether the difference is a reflection of variation in the reaction to silica in the two species or whether it signifies that the exposures in the human cases were greatly in excess of the 200 million particles per cubic foot of air cannot be ascertained.

The character of the silicotic lesions encountered in these cases differs in three particulars from those usually observed:

1. The individual nodules are small but they are massed in zones of considerable width along the course of the deep and superficial pulmonary lymphatic trunks and they are embedded in wide bands of connective tissue which in many places has itself become hyalinized. In the ordinary case the nodules are much larger, sometimes developing from a single center and sometimes resulting from the fusion of adjacent foci; but they tend to remain discrete and in the absence of concurrent infection they are not matted together in a mass of fibrous tissue.

2. The lymph nodes which drain the lung are ordinarily severely affected before the pulmonary changes have progressed very far, but in about one-third of the cases under discussion there was no evidence of silicosis in this location; and in others the involvement was relatively slight. It is possible that this may have been due to faulty selection of material, but it seems rather unlikely, for in most instances several nodes were sectioned.

3. All of the lungs showed an appreciable generalized thickening of the alveolar walls. Some of this reaction was undoubtedly due to the superimposed infection, but in the acute caseous pneumonias such proliferative changes are absent or not at all prominent.

The objection will immediately be raised that the unusual features of the silicosis which have been described are

only unusual because of the coexistent infection. However, it should be remembered that the caseous pneumonias, at least, were very acute processes, probably non-existent during the period when these men were at work and the primary reactions to the dust were taking place. The group was composed of young adults, negroes in most cases, with probably little or no immunity to tubercle bacillus, so that their infections ran an acute course with a fatal termination in 15 months or less. If they had become infected while their silicosis was in its formative stages they would not have been able to continue so strenuous an employment and many would have died months earlier. It is tempting to speculate that because their microscopic silicotic lesions impaired the efficiency of their pulmonary lymphatics, these non-immune individuals were rendered even more susceptible to the action of the tubercle bacillus. In the non-immune individual with recognizable *advanced* silicosis a primary infection with the tubercle bacillus will sometimes cause death in 3 or 4 months. Whether this is also true of the type of silicosis under discussion remains to be demonstrated.

For these reasons it is believed that the localization of the silicotic nodules in this group of cases was not materially influenced by the terminal tuberculosis. Possibly their rate of development was accelerated by the presence of the infection. If it is granted that the dust concentrations to which the men were exposed were unusually high, this might well be the cause for the peculiarities described. It is known that if dust is inhaled for a long time in concentrations only moderately in excess of the physiological limits, the first manifestations of its presence will be reaction in the lymphatic system, both in the mediastinal lymph nodes and in the lungs. Such is the sequence in ordi-

nary silicosis. On the other hand, if the concentrations are so excessive that lymphatic system is entirely inadequate to eliminate the major portion of the foreign material, reaction would be expected to take place within all portions of the lung. The unusual picture of widespread thickening of the alveolar walls and of broad bands of cellular or hyaline connective tissue studded with nodules along the superficial lymphatics of the pleura and the deep lymphatics in the septa, bronchi, and blood vessels has been interpreted as reaction to excessive quantities of dust.

To what extent the factor of fineness of the dust particles contributed there is little adequate information. The sections, when examined in polarized light, exhibit exceedingly large numbers of very minute particles with comparatively few large ones. Time has been lacking to make a size distribution study of the particles from digested portions of these lungs. Experiments<sup>8</sup> have demonstrated that in rabbits the rate of the silicotic reaction varies directly with the size of the particles.

Finally, it should be mentioned that the diagnosis of tuberculosis superimposed upon silicosis of this character has often been most difficult. Other pathologists reviewing the same material have in some instances failed to agree. The lesions characteristic of the chronic forms of tuberculosis are often few in number. The necrosis produced by silica in non-tuberculous exudates often simulates caseation which has necessitated the examination of many sections before definite tuberculous lesions could be detected. Tubercle bacilli were only discovered after prolonged search in 50 per cent of the lesions examined. It is unfortunate that guinea pig inoculations could not have been made. If errors have been made it is felt that they occurred in classifying the non-tuberculous pneumonias as such rather than the reverse.

The roentgenographic appearances of the tunnel men have been discussed by H. L. Sampson.<sup>9</sup> He and the author had opportunity to examine a large number of films from other members of this group, but those of the particular men who died and were autopsied have not yet become available. In the group as a whole roentgenographic evidence of silicosis was very slight or absent; only changes due to infection could be readily recognized.

In view of the fact that microscopic examination revealed so many silicotic lesions, it is perhaps surprising that the X-ray failed to detect them. Analogous situation has been encountered in the roentgenological study of experimental silicosis in rabbits. After 13 months' exposure to rather heavy concentrations of crystalline silica, the X-ray reveals no definite change in the lung of the living animal, and yet if it is killed the lungs show a most extensive nodular silicosis. After 2 years' exposure, however, the amount of disease increases sufficiently to permit the visualization of nodular shadows. The same conditions obtain with respect to miliary tuberculosis in human beings. The lungs may show no evidence of a disseminated process in one examination, but if serial films are taken the time soon comes when tubercles can be visualized throughout the lungs.

#### SUMMARY

A histological study of 15 cases of so-called "acute" silicosis has been reported. This was based upon examination of the lung tissues of 9 tunnel workers exposed for 9 to 13 months, 3 sand blasters for 12 to 17 months, and 3 sand pulverizers on whom satisfactory histories of exposure were not obtained. Chemical analysis demonstrated that their lungs contained as much silica as those of South African gold miners employed for long periods. Their alleged occupational exposures did

## PLATE I



FIGURE 1.—14 months exposure in tunnel; died 13 months later. Silicotic nodules surrounded by cellular connective tissue. Exudate in air spaces.



FIGURE 2.—7 years in coal dust, 13 months in tunnel; died 9 months later. Silicotic nodules larger than those in Figure 3; marked interstitial fibrosis; pneumonic reaction in lower fourth of section, probably tuberculous.



FIGURE 3.—12 months in tunnel; died within a year of acute tuberculous pneumonia. Section through area without obvious tuberculosis. Note clusters of very fine nodules along vessels through the center of the field.



FIGURE 4.—11 months sand blasting; died 22 months later of acute tuberculous pneumonia. Silicotic nodule in right lower corner. Thickened alveolar wall and perivascular cellular fibrosis in right upper field. Necrotic exudate and cholesterol clefts within air spaces.



not exceed 17 months, a contention which is supported by the early age of the group as a whole. These men died of infection 9 to 21 months after ceasing work. In 11 of them the infection was considered to be definitely tuberculous, and in 2 others it was probably so. The other 2 had unresolved pneumonias. All but 1 of them, a tunnel man for 13 months, presented microscopic lesions characteristic of silicosis, but in no case was the disease sufficiently far advanced to be diagnosed on gross examination of the fixed tissues. The character and distribution of the changes did not resemble that usually seen in silicosis among miners and others who have died after prolonged exposures. This silicosis was characterized: (1) by masses of small nodules embedded in broad sheets of fibrous tissue surrounding the pulmonary lymphatics instead of isolated conglomerate nodules along the trunks and in the pulmonary parenchyma; (2) by a generalized fibrous thickening of the alveolar walls which is generally considered to be a late manifestation; and (3) by the absence or only slight involvement of the mediastinal lymph nodes which are usually replaced by fibrosis before extensive changes appear in the lung. These differences were interpreted as due to the inhalation of such excessive amounts of fine dust that little of it could be eliminated by the lymphatics. In most cases the tuberculous complication was so acute that it probably developed after the reaction to the dust was well established, and

thus failed to influence the picture greatly.

The acuteness of the infection was explained by the fact that the majority of the men were young negroes with presumably little immunity to tuberculosis. Although there is histological evidence of silicosis, atypical in character, it seems doubtful whether there is justification for describing the process as "acute." At least this should only be done after serial roentgenograms together with post-mortem examinations have demonstrated the outcome of the allegedly heavy exposures to silica. The difficulty in properly evaluating the element of infection in the tissues suggests the need for caution in the interpretation of roentgenograms.

#### REFERENCES\*

1. Macdonald, G., Piggot, A. P., and Gilder, F. W. Two Cases of Acute Silicosis with a Suggested Theory of Causation. *Lancet*, CCXIX:846 (Oct. 18), 1930.
2. Gerlach, W. and Gander, G. Über Akute Staublungen Zugleich ein Beitrag zur Frage Staublung und Lungentuberkulose. *Arch. f. Gewerbepath. und Gewerbehyg.* 3:1, 44, 1932.
3. Chapman, E. M. Acute Silicosis. *J.A.M.A.* Apr. 23, 1932, pp. 1 and 39.
4. Kessler, H. H. Silicosis in the Abrasive Industry. *Abst. A.J.P.H.* XXI, 12:1391 (Dec.), 1931.
5. Smith, Clayton S. The Silica Content of the Lungs of a Group of Tunnel Workers. *A.J.P.H.* XXIII, 12:1250 (Dec.), 1933.
6. McCrae, John. The Ash of Silicotic Lungs. *Genl. Rep. Miners' Phthisis Committee*, Appendix 7. Pretoria. Gov't Printing Office, 1916.
7. Gardner, L. U. Studies on Experimental Pneumonokoniosis VIII Inhalation of Quartz Dust. *J. Indust. Hyg.* XIV:18, 1932.
8. Gardner, L. U. Silicosis. *J. Indust. Med.* July, 1933.

Acknowledgment is due to the various persons who have so painstakingly secured data and pathological material for this study. They cannot be named at this time as in some instances litigation is still pending.

# The Silica Content of the Lungs of a Group of Tunnel Workers\*

CLAYTON S. SMITH, PH.D., M.D., AND HELEN L. WIKOFF, PH.D.

*Laboratory of Physiological Chemistry and Pharmacology of the  
Ohio State University, Columbus, Ohio*

THE presence of silica in the lungs of an individual at post-mortem suggests the possibility of the disease silicosis during life. The diagnosis of silicosis is based on data secured from three principal sources: the history, particularly the occupational history, the physical examination, and the roentgenological examination of the lungs. Silicosis has been recognized at least until recently as existing in three different stages. The "stages" are given different names by British and American workers but are essentially the same in their clinical manifestations. In the British Dominions these stages are defined by law, but in America this is not true. Not only may silicosis exist in any one of three stages but it may be, and frequently is, complicated by other respiratory diseases, particularly tuberculosis. This complicates the differential diagnosis.

Investigations covering the etiology,<sup>1</sup> clinical manifestations<sup>2</sup> and roentgenologic aspect<sup>3</sup> of silicosis have so recently been made that it is only necessary to refer to the published reports where each of these phases is covered in detail.

The chemical examination of the lungs of persons dying of respiratory diseases offers definite aid in the final

diagnosis of the disease. Unfortunately this means cannot be used until the patient has succumbed, but, nevertheless, the data secured may be of considerable value in confirming previous findings in the adjustment of industrial compensation claims.

When the total number of deaths from respiratory diseases is considered, the number of reported chemical analyses of the lungs of such individuals is very meager. It is, therefore, important that the chemical analyses of any group of lungs, no matter how small, be reported promptly in order that all interested in the general subject of pneumoconiosis may profit by the added information.

Quite recently two papers on the chemical analyses of lungs have appeared, one<sup>4</sup> in this country and one<sup>5</sup> in England. Since one appeared in July and the other in August, 1933, it will not be necessary to review the literature on the chemical analyses of lungs at this time (October, 1933). A comprehensive review may be obtained from Dr. McNally's paper.

Silicon is a widely distributed element and exists in nature chiefly in the form of the oxide,  $\text{SiO}_2$ , and as silicates of various kinds. Some authorities make a differentiation between silicosis and silicatosiis, the one being caused by  $\text{SiO}_2$  and the other by silicates. This distinction can only be made with assurance when it is known that the in-

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

haled dust consists principally of silicates and not  $\text{SiO}_2$ . Our present methods of chemical analysis of the lungs do not permit of a very accurate separation of free and combined silica. For this reason the silica found in lungs is reported as total  $\text{SiO}_2$  which includes both the free and combined forms. Silicosis apparently may be produced by either  $\text{SiO}_2$  or silicates when inhaled in the form of dust. Kaolin may be an exception to this statement.<sup>6</sup> Kaolin when injected into the subcutaneous tissues produces necrotic lesions similar to amorphous silica but in industrial medicine kaolin is not generally recognized as a cause of pneumoconiosis. In dust inhalation experiments on guinea pigs it has been shown by H. M. Carleton<sup>7</sup> and F. Haynes<sup>8</sup> that kaolin is at least a potentially dangerous dust. Not only must the dust contain silica or silicates but the dust must be very finely divided in order that the silica may become fixed in the lung. McCrea<sup>9</sup> reports that approximately 70 per cent of the particles recovered by him from post-mortem lung tissue had a diameter of less than  $\frac{1}{8}$  that of a red blood cell.

How silica produces the characteristic changes in the lungs is not clearly understood. The original theory was that because of its hardness, sharpness, and relative insolubility, the silica dust caused direct injury to the lung tissue but this theory has in the main been discarded, principally for two reasons. Recent investigations have shown that the dust particles in order to be absorbed into the lung tissue must be much too small to produce any direct mechanical injury. Furthermore it has been shown that silica is not the totally insoluble substance it was once believed to be.

The modern viewpoint is that the changes brought about in the lung by silica are due to its chemical action. It is only fair to state that it is not known

whether in the lung the silica acts as a protoplasmic poison or whether its action is due solely to its colloidal properties.<sup>10</sup>

The material for the present investigation was obtained through the courtesy of Dr. L. R. Harless of Gauley Bridge, W. Va. Previous to the time that the material was made available for us, sections of the lungs had been removed for other purposes so that it was impossible for us to obtain the weight of the entire lungs. The lungs had been preserved for varying periods of time in formalin solution. In no case was a metal-containing preservative used, so that the ash reported represents the true ash content of the lung without any added salts. In some of the specimens it was possible to select portions which on gross examination appeared to be normal. These are designated in our report as "normal," but it does not mean that the portions taken were histologically normal. However, our results show that in the same individual the area that was apparently normal actually did contain less silica than other portions of the same lung. In one or two instances we were able to secure portions of the right and left lung of the same individual.

The material for analysis consisted of 10–15-gram sections taken from various parts of the lung in order to obtain a representative sample. Care was taken to exclude the bronchial lymph nodes, as it was assumed that they would be unusually high in silica. The material thus obtained from each specimen of lung was hashed in a meat chopper. A weighed sample of the hashed lung was dried to constant weight at  $100^\circ \text{C}$ . The loss in weight at  $100^\circ \text{C}$ . is not recorded in our table as it represents the water content of the lung plus the volatile preservatives and is not a measure of the true value of any lung constituent.

The dried lung substance was then ashed in platinum in a muffle furnace

at low red heat. The weight of the residue was recorded as total ash. The ash was then treated with dilute hydrochloric acid at boiling temperature. The insoluble residue was washed, dried and ignited to constant weight which was recorded as the acid insoluble ash. The acid insoluble ash was then treated with hydrofluoric acid. This converted any silica present into silicon tetrafluoride which volatilized on heating. The loss in weight was recorded as silicon dioxide. It is interesting to note that the weight of the acid insoluble ash and the loss in weight after treatment with hydrofluoric acid were practically identical, showing that the acid insoluble ash was silicon dioxide without the admixture of other substances.

The total ash and the silicon dioxide are reported on the basis of per cent of dry lung substance. In order that our figures may be readily compared with those recorded by other workers we have included in our Table I a column showing the per cent silicon dioxide in the total ash. Some writers record their results as mg. per gm. of dried lung substance. Milligrams per gm. may be readily converted into per cent by dividing the mg. per gm. by 10, which will give gm. per 100 gm. or per cent. However, the majority of analysts in this field have recorded their results in terms of per cent  $\text{SiO}_2$  in the dried lung substance or per cent  $\text{SiO}_2$  in the total ash.

For the histological diagnosis in each

TABLE I  
SHOWING PER CENT TOTAL ASH AND PER CENT SILICA OF DRIED LUNG SUBSTANCE

Case	Color	Age	Occupation	Histological Diagnosis		Ash Per Cent of Lung	$\text{SiO}_2$ Per Cent of Lung	$\text{SiO}_2$ Per Cent of Ash	Remarks
1	C	37	Driller	Silicosis 4 † Tuberculosis ?		8.12 5.97 *	2.16 0.33	26.60 5.53	Worked 52 weeks in tunnel 1930-1931; no previous mining experience; died 8/31/32.
2	W	45	Laborer	Silicosis 4 † Non-tuberculous pneumonia		6.16	3.10	50.33	Steel nipper in tunnel July, 1930 to latter part of Feb., '31. Had worked in mines 4 or 5 years. Died 10/12/32.
3	C	24	Laborer	Silicosis 1 † Tuberculosis		3.14 3.51	0.91 0.84	29.00 23.93	Steel nipper and gas dinky operator 10 months in tunnel 1931. No previous mining experience. Died 9/2/32.
4	C	29	Driller	Silicosis 4 † Tuberculosis	Left Right	6.35 5.85 * 8.08 8.24 *	2.69 1.37 5.09 1.97	42.36 23.41 63.00 23.93	June, 1931-March, 1932 (9 mos.) in tunnel. Died June 8, 1933. Had worked in coal mines of West Va. 3 or 4 years.
5	W	23	Laborer	Silicosis 4 † Tuberculosis ?	Right Left	4.47 * 4.19 4.87	1.35 2.01 2.59	30.20 47.97 52.96	Approximately 7 years in coal mines of West Va. Laborer and steel nipper 52 weeks (1930-31). Died 9/25/32.
6	C	21	Laborer	Silicosis 4 † Tuberculosis		5.91 † 5.39 ‡	1.98 1.97	33.50 36.55	Mucker and drill helper 40 weeks in tunnel 1931. No previous mining experience. Died 12/7/32.
7	C	38	Driller	Silicosis 4 † Tuberculosis		5.56	2.58	46.40	No coal mining experience. Driller 66 weeks (1930-32), in tunnel. Died 2/5/33.
8	C	29	Driller	Tuberculosis		5.17 * 5.07	0.90 0.78	17.40 15.38	No previous mining experience, 58 weeks as driller (1930-31). Died 2/16/33.
9	C	34	Driller	Silicosis 4 † Tuberculosis		6.12	2.77	45.26	Previous industrial history unknown. 48 weeks (1931-32) as driller. Died April, 1933.

\* Sample apparently normal on gross examination.

† Had appearance of red hepatization on gross examination.

‡ Had appearance of gray hepatization on gross examination.

case we are indebted to Dr. Leroy U. Gardner of Saranac Laboratory, and for the occupational history to Dr. L. R. Harless of Gauley Bridge, W. Va.

The purpose of silica determinations in cases of pneumoconiosis is to secure data from which may be derived some analytical criterion which would materially assist in making a differential diagnosis. The criterion might be an analytical value or a ratio between two analytical values. Both of these ideas have been tried.

In their paper on coal miners' lungs Cummins and Sladden<sup>11</sup> calculated a ratio between the combustible material of the lung and the silica content. This ratio was assumed to be an index of the severity of silicosis. In his most recent paper Sladden did not make use of this factor, but classified the intensity of his cases of silicosis on the basis of the per cent of  $\text{SiO}_2$  in the dried lung substance. He concluded that when the dried lung substance contained more than 1 per cent  $\text{SiO}_2$  the case was probably silicotic, and that when the per cent of  $\text{SiO}_2$  in the lungs reached 1.6 there were practically no exceptions to the diagnosis of silicosis.

The literature contains several reports of the analyses of the total ash of lungs. In these reports the silicon dioxide is reported as per cent  $\text{SiO}_2$  in the total ash. For a review of these cases reference is made to Dr. McNally's paper. Previous work may be summarized by stating that the older authors believed that silica was not present in the lungs of new-born infants. Three-quarters of a year was the time frequently quoted when silica first appeared. As the number of chemical analyses of lungs of persons of various ages and occupations increases it will probably be shown that the amount of silica in the lungs of normal individuals depends somewhat upon environment as well as upon age. It is obvious that the dust from paved streets or roads will be

different in composition from that of unpaved roads. The composition of dust from unpaved roads will depend upon the nature of the soil in the locality. Normal individuals of the same age having lived all of their lives in different environments will undoubtedly show considerable variation in the silica content of their lungs.

Wells<sup>12</sup> in his *Chemical Pathology* states that lungs of individuals whose occupations do not expose them especially to dust inhalation contain increasing amounts of silicates in direct proportion to age; the silicates then constitute from 3.5 to 10 per cent of the total ash of the lungs.

The 9 cases reported in this paper were men who were engaged in the same project, namely, the construction of a tunnel through rock rich in silica. Their exposure to silica dust depended somewhat upon the nature of their occupation. Our analytical findings with the histological diagnosis and occupational history are recorded in Table I.

Since the purpose of the chemical analysis is to make the diagnosis more definite, some of our data ought to be capable of close correlation with data secured by an entirely independent method of diagnosis. The test will then be a comparison of the chemical findings with the histological diagnosis. If one compares the per cent of ash in the dry lung substance in each case with the histological diagnosis he will note a very good correlation, for the  $\text{SiO}_2$  content of the lung increases with the severity of the case. On the other hand, if the severity of the case is to be determined chemically by the per cent  $\text{SiO}_2$  in the total ash, the correlation fails. We believe therefore that the per cent  $\text{SiO}_2$  in the dry lung substance is a much better criterion of silicosis than is the per cent of  $\text{SiO}_2$  in the total ash. Our findings of  $\text{SiO}_2$  in the dried lung substance agree essentially with those reported by Sladden.<sup>5</sup>

TABLE II  
TYPICAL ANALYSES REPORTED IN THE LITERATURE BY OTHER INVESTIGATORS

Case	Author	Per Cent Ash in	Per Cent $\text{SiO}_2$ in	Per Cent $\text{SiO}_2$ in	Remarks
		Dried Lung	Dried Lung	Ash	
1	McCrae <sup>b</sup>	4.54	1.39	30.7	African gold miner
2	"	6.46	1.90	29.4	" " "
3	"	5.47	2.23	40.8	" " "
4	"	9.30	4.47	48.0	" " "
5	"	6.49	2.98	45.3	" " "
6	"	6.51	2.81	43.2	" " "
44	McNally <sup>a</sup>	10.78 *	0.86 †	7.98	Mill stone sharpener
503	"	17.14 *	1.40 †	8.16	Stone cutter
327	"	12.36 *	0.24 †	1.94	Machinist
429	"	14.58 *	0.36 †	2.47	Engineering draftsman
463	"	19.99 *	0.43 †	2.15	Coal miner, 25 years
411	"	8.84	0.50 †	5.65	Stone quarry, 9 years
300	"	8.46	2.60 †	30.73	Granite cutter
446	"	5.59	1.09 †	19.50	Zinc miner
1	Pancoast and <sup>13</sup> Pendergrass	6.17	1.81	29.3	Sand blaster
2	"	8.01	3.29	40.6	Sand blaster
3	"	6.94	2.10	30.3	" "
4	"	6.59	2.45	37.2	" "
40	Sladden <sup>b</sup>		1.72		Coal miner
41	"		1.78		Potter
42	"		1.80		Coal miner
43	"		1.78		Coal miner
44	"		1.91		Repairer (coal mine)
45	"		1.98		Coal miner
46	"		2.08		Coal miner
47	"		2.16		Coal miner
48	"		2.28		Coal miner

\* High ash due to Kaiserling solution used as preservative.

†  $\text{SiO}_2$  calculated as per cent from milligrams per gram as reported.

For the purpose of comparison we have prepared Table II which contains data taken from the publications of other workers in the same field. In the case of Dr. Sladden's article only one section of his analytical report is reproduced. The case numbers in each instance are those of the original authors. In order that the compilation might be truly representative we have included reports from various parts of the world.

#### SUMMARY

The lungs of 9 workmen engaged in the same tunnel project have been analyzed.

There is a striking correlation between the per cent  $\text{SiO}_2$  in the dried lung substance and the severity of silicosis as determined histologically.

#### CONCLUSION

The per cent  $\text{SiO}_2$  in the dried lung substance is a better criterion of the

intensity of silicosis than is the per cent of silica in the total ash.

#### REFERENCES

1. Lanza, A. J. Etiology of Silicosis, *J.A.M.A.* 101:583 (Aug. 19), 1933.
2. Sayers, R. R. The Clinical Manifestations of Silicosis, *J.A.M.A.* 101:580 (Aug. 19), 1933.
3. Pancoast and Pendergrass. Roentgenologic Aspect of Pneumoconiosis, *J.A.M.A.*, 101:587 (Aug. 19, 1933).
4. McNally, W. D. Silicon Dioxide Content of Lungs in Health and Disease, *J.A.M.A.* 101:584 (Aug. 19), 1933.
5. Sladden, A. F. The Silica Content of Lungs, *Lancet* 225:123 (July 15), 1933.
6. Kettle, E. H. The Interstitial Reactions Caused by Various Dusts and Their Influence on Tuberculous Infection. *J. Path. & Bact.*, 35:395 (May), 1932.
7. Carleton, H. M. The Pulmonary Lesions Produced by Inhalation of Dust in Guinea Pigs. *J. Hyg.* 22:438, 1924.
8. Haynes, F. Experimental Dust Inhalation in Guinea Pigs. *J. Hyg.* 31:96, 1931.
9. McCrae, John. The Ash of Silicotic Lungs. *South African Institute for Medical Research, Pub. 3*, p. 122, Mar. 3, 1933.
10. Hefiennan, Patrick. The Method of Action of Silica Dust in the Lungs. *J. Indust. Hyg.* 10:272, 1928.
11. Cummins and Sladden. Coal Miners' Lungs. *J. Path. & Bact.* 33:1095 (Oct.), 1930.
12. Wells, H. G. *Chemical Pathology*, 5th ed., 1925. W. B. Saunders Co.
13. Pancoast and Pendergrass. Review of Pneumoconiosis. *Am. J. Roentgenology*, Vol. 26, p. 556, Oct., 1931.

# Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools\*

A. H. FLETCHER, F.A.P.H.A., AND E. C. LINK

*Director, Bureau of Sanitation, Department of Health, Memphis, Tenn.; and  
Director, Bureau of Laboratories, Department of Health,  
Memphis, Tenn.*

IN Memphis, during this summer swimming pool season, the 13 pools that have been operating were studied as a group in the routine health department control program. These pools present a variety of conditions with reference to design, equipment, bathing load, source or chemical quality of the water. They might be grouped into 4 general classes. Four of them are outdoor fill-and-draw pools, while 2 are indoor fill-and-draw pools. Three others are distinctly poorly designed from the standpoint of inlet location or slow rate of recirculation and 3 of the remaining 4 are fairly well designed as to inlet spacing and rate of recirculation but their ultra-violet ray machines have been abandoned and the disinfecting agent must be added by hand. The last of the 13 pools has been built this summer and is designed for an 8-hour "turnover" and with proper inlet and outlet locations to enable the maintenance of a uniform residual in all parts of the pool at all times, using chlorine alone as the disinfecting agent. This is the only pool which has been built within the last 6 years and the only one equipped to disinfect satisfactorily with chlorine alone.

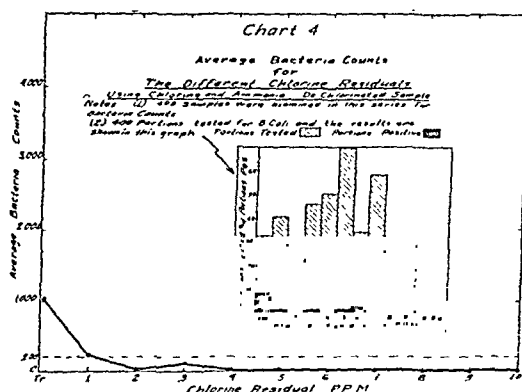
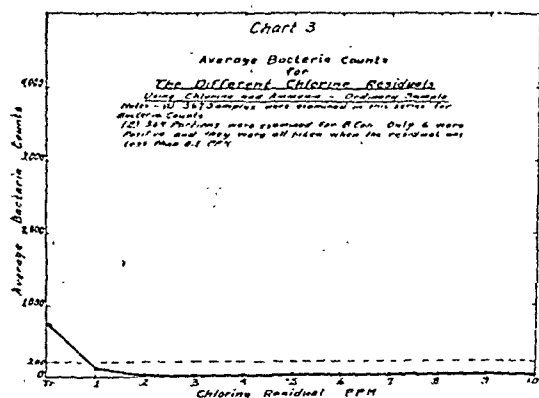
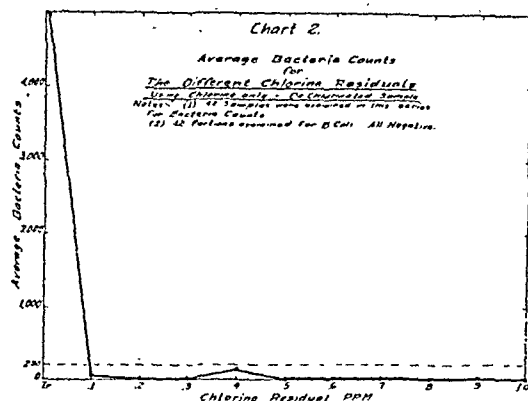
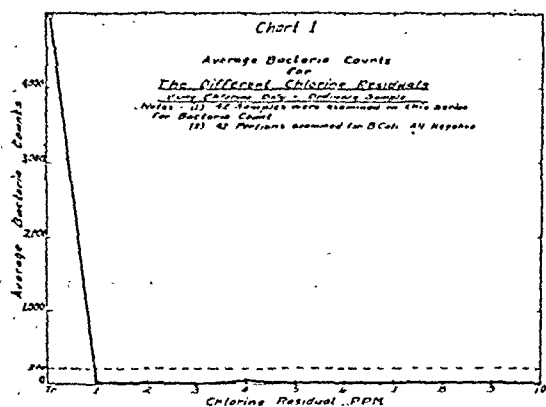
The use of chloramines in swimming pool disinfection has therefore, been of special interest here because of:

1. Its ability to improve the distribution and maintenance of a uniform chlorine residual throughout all parts of the pool and for longer periods of time.
2. The increasing of the permissible upper limit of the chlorine residual. Residuals of up to 1 full p.p.m., if using ammonia with the chlorine. While using chlorine alone the upper limit is 0.5 p.p.m. without causing complaints of odors and smarting of the eyes.<sup>1</sup>
3. The definite saving in the cost of disinfection of these pools in past years, using ammonia with chlorine, over those using chlorine alone. For swimming pools having an 8-hour "turnover" period and a satisfactory number and spacing of inlets, the saving shown in the pool studied here would undoubtedly be misleading, as it was necessary in using chlorine alone to maintain excessive residuals in parts or streaks of the pool in order to have a slight, 0.1, or 0.2 p.p.m. of chlorine in other parts.

At the American Public Health Association Meeting in Washington last year, the usual method of collecting samples for bacteriological examination, that is the holding of the samples after collecting for a period of time before testing, was condemned as giving a false feeling of security. Mallmann and Cary<sup>2</sup> concluded:

Samples of swimming pool water collected during periods of use and tested immediately after collection showed more pollution than duplicate samples handled in the usual manner by storing and testing later. . . .

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.



sults of the 42 samples collected, where chlorine was used alone, in sodium thiosulphate treated bottles. The average count was 44 when the residual was 0.1 p.p.m. The average count above this residual never ran more than 136.5 bacteria per c.c. Forty-two samples tested for *B. coli* were all negative. Chart 3 represents the results of 567 samples collected from 11 pools where chlorine and ammonia were used. The average count from the samples collected in the ordinary bottles at 0.1 p.p.m. was 136 and at 0.3 p.p.m. was 4. Five hundred and sixty-seven portions were tested for *B. coli* and there were 6 positives in portions containing less than 0.1 p.p.m. From 11 pools 408 samples were collected in bottles that had been treated with sodium thiosulphate to dechlorinate the sample at the time of collection. The average bacteria count at 0.1 p.p.m. was 220, and the average count at any chlorine residual above 0.1 p.p.m. never ran as

high as 100 bacteria per c.c. as shown by Chart 4. A *B. coli* graph inset in Chart 4 shows the number of positive portions in black and the number of portions tested in the outlined bar.

The work of Schmelkes<sup>3</sup> showed that a high free ammonia content slowed up the reaction of chlorine on bacteria. It is interesting to note, however, that the positive *B. coli* samples at 0.6 p.p.m. and 0.5 p.p.m. were collected at times when the pH and free ammonia content were probably normal.

At a residual of 0.6 p.p.m. there were 2 positive *B. coli* portions out of 33 portions tested. The samples from which the 2 tests were made were collected at about 11 A.M. from a fill-and-draw pool 3 days after the pool had been drained, cleaned and filled with fresh water. The bacteria counts on the 2 samples were 10 and 20 for the dechlorinated samples and 2 and 2 for the ordinary samples with the *B. coli* for the ordinary samples negative. No



TABLE I  
RESULTS OF TESTS TO DETERMINE POSSIBLE STERILIZING EFFECTS OF  
DECHLORINATING PROCESS  
Plate Counts

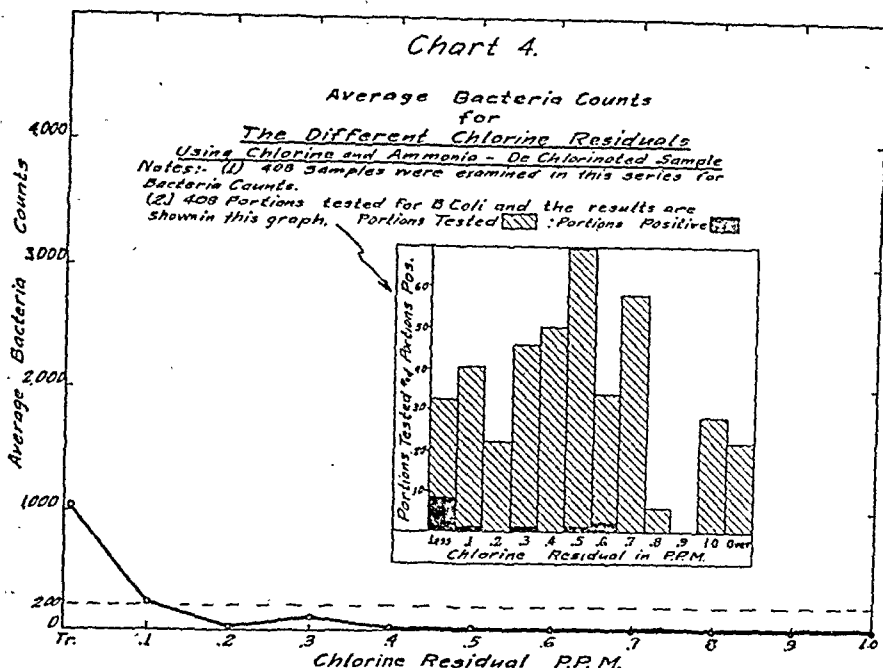
	Time from addition of chlorine to plating						
	0 hr.	1 hr.	2 hr.	6 hr.	24 hr.	48 hr.	1 week
Series I							
(1) Culture (into 100 c.c. sterile water)		6,200			12,000		18,000
(2) Culture plus (99 c.c. sterile water) plus 1 c.c. sodium thiosulphate		6,500			15,000		20,000
(3) Culture plus (49 c.c. sterile water) 1 c.c. sodium thio-sulphate plus 50 c.c. chlorinated water		6,500			16,000		21,000
(4) Duplicate of (3)		6,600			15,000		18,000
Series II							
(1)	20,000					54,000	
(2)	22,000					60,000	
(3)	24,000					66,000	
(4)	24,000					60,000	
Series III							
(1)			50	62			
(2)			52	66			
(3)			52	68			
(4)			48	68			

Nitrite and Ammonia Determinations: Occasional checks were made on nitrite and ammonia content of various pools during the season. In all cases except one, the pools were being operated under normal conditions and no unusual results were obtained.

In the routine swimming pool control programs it was found difficult to control the ratio of ammonia to chlorine that is added by the pool operator, and it was also difficult to control the amount of free ammonia in the pool unless tests for free ammonia were made at times when the Health Department felt that the ammonia content might be increasing to a higher concentration. In the outdoor pools

using chlorine and ammonia, the free ammonia content was kept down so that at no time did the free ammonia content run more than 1.3 p.p.m.

All of the outdoor pools using chlorine and ammonia found it necessary to drain and refill once every 2 weeks because of the increase in temperature of the water. In one of the indoor pools where the pool had been in operation for some 4 weeks, difficulty was encountered in maintaining a residual chlorine content in spite of heavy increases in chlorine dosage. Laboratory tests were made for nitrites, free ammonia, and albuminoid ammonia. The free ammonia content was 8 p.p.m. However, while duplicate



every second night after closing the pool. The copper sulphate was added by dragging 50 lb. in burlap bags around the pool to distribute it evenly. It was necessary to flush or skim the top of the pool each morning after dosing with copper sulphate because of the formation of a greenish oily scum.

#### OBSERVATIONS AND CONCLUSIONS

1. The decided advantage in the use of chloramines for disinfection of swimming pools having a slow rate of recirculation, poor spacing of inlets, hand application of chlorine, or those operated as fill-and-draw pools, and especially when the pool is out of doors, has prompted its use for another season.

2. The use of chloramines instead of chlorine alone requires certain extra tests and control to guard against its limitations. Some of these are:

- a. The requirement of higher residuals, that is from 0.7 to 1 p.p.m.
- b. The control of the ratio of ammonia to chlorine and of the free ammonia content in the water.
- c. The control of the pH of the water routinely.

d. The collection of all samples in sodium thiosulphate treated bottles. (It is hoped that during the coming season it will be possible to establish a pool side laboratory for checking dechlorinated samples.)

3. The duplicate series of tests run this year on ordinarily collected samples and dechlorinated collected samples showed a lag in the killing power of chloramines over the chlorine on *B. coli*.

4. A moderate excess of sodium thiosulphate when used as an antichlor was found to have no disinfecting effect.

5. Copper sulphate definitely and completely controlled algae or slime growth at any pool where it occurred in Memphis if added every second night after closing at a dosage rate of 5 lb. to each 100,000 gal. of water.

#### REFERENCES

1. Fletcher, A. H., and Clark, E. H. Application of the Principles of Water Purification to the Control of Swimming Pools. *A.J.P.H.* XXIII, 5:407 (May), 1933.
2. Mallmann, W. L., and Cary, William. Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine. *A.J.P.H.* XXIII, 1:35 (Jan.), 1933.
3. Schmelkes, F. C. The Oxidation Potential Concept of Chlorination. *A.J.P.H.* XXIII, 3:269 (Mar.), 1933. Abstract of paper read at Washington meeting of A.P.H.A., 1932.

according to Schottmüller. Four were hemolytic.

Puppel (1912) found that out of 18 mastitis streptococci, only 1 was hemolytic on human blood agar.

Jones (1918) described hemolysis in a number of strains which very probably could be termed *S. mastitidis*, but he states: "Mastitis caused by infections with non-hemolytic streptococci is more prevalent than that caused by other classes of microorganisms."

Ayers and Mudge (1922) examined streptococci originating from the udder. Of the 79 strains which were found to be *S. mastitidis*, 64 were of the beta hemolytic type, 15 of the gamma type. The blood medium used was prepared according to Brown and no sugar was added.

Carpenter (1925) found in 150 samples of milk from suspected cases of mastitis, alpha hemolytic streptococci in 79 per cent and beta hemolytic in 6.6 per cent of the cases. Whether the latter were *S. mastitidis* in a strict sense is impossible to say from the data presented.

Minett, Stableforth and Edwards (1929) found more than half of the strains they considered to be *S. mastitidis* bovis to be beta hemolytic and the majority of the remainder to be of the viridans type.

Bergey (1930) gives *S. mastitidis* as hemolytic.

Klimmer and Haupt state (1930): "*S. agalactiae* grows, in our experience predominantly as the alpha type, rarely according to the alpha prime type, comparatively frequently as the gamma type, never as the beta type."

Haupt (1931) never found beta hemolysis in *S. mastitidis*.

Minett, Stableforth and Edwards (1931) stated in answer to Haupt that *S. mastitidis* may be either alpha or beta hemolytic and pointed out that the variation in results between Haupt and themselves was caused by a dif-

ference in composition of the blood medium used. Haupt added 0.05 per cent glucose while they used a sugar-free medium.

Diernhofer (1932) mentions two varieties of *S. mastitidis*, one as an-hemolytic and the other as a beta hemolytic variety.

Seelemann (1932) did not observe hemolysis in true mastitis streptococci. He tested 300 strains using red cells of ox and sheep and 80 on horse blood agar. In some cases a faint clear halo was observed. Steck (1932) examined 24 *S. mastitidis* strains on Brown plates and found that all were of the alpha type. Hadley and Frost (1933) use the name *S. mitis* for the alpha streptococcus responsible for the majority of cases of mastitis. They reserve the term *S. mastitidis* for beta hemolytic types.

Rosell (1933) examined the behavior of 268 strains of typical mastitis streptococci and found 3 only to be beta hemolytic, the remaining being of the alpha or gamma types, using horse and sheep blood in the Brown technic. On cow's blood 10 per cent of the strains were beta hemolytic. No sugar was added to the medium, but horse meat or Liebig's meat extract were recommended.

The disagreement between different authors in regard to the action of *S. mastitidis* toward blood media may be due to several reasons: (1) The name *S. mastitidis*, may be taken in too broad a sense including practically any streptococcus that may be isolated from the udder. (2) Differences in technic, composition of the medium, kind of blood, observation of surface colonies being the most important. (3) Difference in interpretation. Alpha prime colonies are, no doubt, frequently regarded as beta colonies.

The object of this discussion is to present data regarding the action on blood of authentic strains of *S. masti-*

that it approaches the beta type. This circumstance explains in a satisfactory way the discord in the conception of Minett, Stableforth and Edwards (1931) on the one hand, and Haupt on the other, as the former investigators used a sugar-free blood medium and the latter one which contains 0.05 per cent glucose. Some variance in the appearance is found when different kinds of blood were used, but in the case of the strains here concerned the variation was not great and only 2 (No. 4 and No. 78) showed a sufficient difference to cause a placing into different types, viz., alpha and alpha prime.

Agreement between the hemolysis on the plates and in the liquid medium was never perfect.

#### SUMMARY

Of 91 authentic strains of *S. mastitidis* being carried in various laboratories as typical streptococci associated with mastitis, 50 were of the alpha and 41 of the alpha prime hemolytic types.

The streptococcus commonly associated with chronic or subclinical mastitis always produces the alpha or alpha prime type of hemolysis on blood agar bordering on a slight beta hemolysis. Strong beta hemolytic strains were not found among the cultures. Two strains of streptococci from mastitis were beta hemolytic, but they were found by cultural studies to be different from the type generally found associated with mastitis.

A careful study of the authentic mastitis streptococci isolated from chronic cases reported to be beta hemolytic were found to be of the alpha prime type. This distinction is apparent when deep colonies are examined by a stereoscopic binocular microscope.

Blood from sheep, ox, and horse were used with similar results. The type of blood did not appear to affect the type of hemolysis produced on blood plates.

#### BIBLIOGRAPHY

- Ayers, S. H., and Mudge, C. S. *J. Infect. Dis.*, 31:40-50, 1922.  
 Bergey, D. H. *et al. Manual of Determinative Bacteriology*. Baltimore, 1930.  
 Brown, J. H. The use of blood agar for the study of streptococci. *Monograph No. 9*, Rockefeller Institute, 1919.  
 Carpenter, C. M. *J. Am. Vet. Med. Assn.*, 67: 317-323, 1925.  
 Diernhofer, K. *Milchw. Forsch.*, 13:368-374, 1932.  
 Gminder, A. *Zentralbl. f. Bakteriol.*, 1 Abt. (Orig.) 63:152-193, 1912.  
 Hadley, F. B., and Frost, W. D. *Cornell Vet.*, 23:40-46, 1933.  
 Haupt, H. *Zentralbl. f. Bakteriol.*, 1 Abt. (Orig.) 120:291-304, 1931.  
 Jones, F. S. *J. Exper. Med.*, 28:149-167, 253-267, 1918.  
 Klimmer, M., and Haupt, H. *Ergebn. Hyg. Bakteriol., Immunität. Exper. Therp.*, 11:354-446, 1930.  
 Marmorek, A. *Ann. de L'inst. Pasteur*, 16:172-178, 1902.  
 Minett, F. C., Stableforth, A. W., and Edwards, S. F. *J. Comp. Path. & Ther.*, 42:213-231, 1929.  
*Zentralbl. f. Bakteriol.*, 1 Abt. (Orig.), 122:466-469, 1931.  
 Puppel, R. *Ztschr. f. Hyg.*, 70:449-496, 1912.  
 Rosell, J. M. *La mammité streptococcique de la vache*. Ministère d'Agr. Quebec, 1933.  
 Seelemann, M. *Die Streptokokkeninfektionen des Euters*. Hannover, 1932.  
 Schottmüller, H. *Münchener med. Wchnschr.*, 50: 849-853, 909-912, 1903.  
 Steck, W. *Arch. f. wiss. u. prakt. Tierh.* 64:300-328, 1932.

(See Table I on the following pages.)

TABLE I

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF  
STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
1	Amer. Type Cul. Col. #342. Originally obtained as <i>Streptococcus mastitidis</i> , from L. A. Rogers, Bur. Dairying, U. S. D. A. Washington, D. C. Isolated by S. H. Ayers, 1925.			a'	a'	a'	-	-	-	
2	Amer. Type Cul. Col. #4170. Originally obtained as <i>S. mastitidis</i> , from George Knaysi, N. Y. State Col. Agr., Ithaca. Isolated by him from milk, 1926.			a'	a'	a'	-	-	-	
3	Amer. Type Cul. Col. #4784. Originally obtained as <i>S. mastitidis</i> , from F. S. Jones (No. N. Y. 21288A) Rockefeller Inst. for Med. Res. Princeton, N. J.	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta
4	Amer. Type Cul. Col. #4785. Originally obtained as <i>S. mastitidis</i> , from F. S. Jones, No. 6204. Rockefeller Inst. for Med. Res. Princeton, N. J.			a	a'	a'	-	-	-	
5	Amer. Type Cul. Col. #4786. Originally obtained as <i>S. mastitidis</i> , from F. S. Jones, No. 7363. Rockefeller Inst. for Med. Res. Princeton, N. J.			a	a	a	-	-	-	
6	Amer. Type Cul. Col. #4787. Originally obtained as <i>S. mastitidis</i> , F. S. Jones (No. K 32) Rockefeller Inst. for Med. Res., Princeton, N. J.			a	a	a	-	-	-	
7	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. <i>Mastitis streptococcus hemolytic</i> , 1932. L. H.	a'	a'	a'	a'	a'	-	-	-	Very broad zones produced round colonies on cow blood but corpuscles near the colony are visible Alpha prime to weak beta.
8	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. <i>Mastitis streptococcus hemolytic</i> , N. Y. 21288A. Identical with 3.	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta
9	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. <i>Mastitis streptococcus non-hemolytic</i> , K 32. P. P. Identical with 6.			a	a	a	-	-	-	
10	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. <i>Mastitis streptococcus non-hemolytic</i> , 7363. K. H. Identical with 5.			a	a	a	-	-	-	
11	M. H. Newman, Cornell Univ. 1927. <i>S. mastitidis</i> .	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta
12	M. H. Newman, Cornell Univ. 1927. <i>S. mastitidis</i> .	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta



TABLE I

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF  
STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
1	Amer. Type Cul. Col. #342. Originally obtained as <i>Streptococcus mastitidis</i> , from L. A. Rogers, Bur. Dairying, U. S. D. A. Washington, D. C. Isolated by S. H. Ayers, 1925.			a'	a'	a'	-	-	-	
2	Amer. Type Cul. Col. #4170. Originally obtained as <i>S. mastitidis</i> , from George Knaysi, N. Y. State Col. Agr., Ithaca. Isolated by him from milk, 1926			a'	a'	a'	-	-	-	
3	Amer. Type Cul. Col. #4784. Originally obtained as <i>S. mastitidis</i> , from P. S. Jones (No. N. Y. 21288A) Rockefeller Inst. for Med. Res. Princeton, N. J.	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta
4	Amer. Type Cul. Col. #4785. Originally obtained as <i>S. mastitidis</i> , from F. S. Jones, No. 6204. Rockefeller Inst. for Med. Res. Princeton, N. J.			a	a'	a'	-	-	-	
5	Amer. Type Cul. Col. #4786. Originally obtained as <i>S. mastitidis</i> , from P. S. Jones, No. 7363. Rockefeller Inst. for Med. Res. Princeton, N. J.			a	a	a	-	-	-	
6	Amer. Type Cul. Col. #4787. Originally obtained as <i>S. mastitidis</i> , F. S. Jones (No. K 32) Rockefeller Inst. for Med. Res., Princeton, N. J.			a	a	a	-	-	-	
7	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus hemolytic, 1932. L. H.	a'	a'	a'	a'	a'	-	-	-	Very broad zones produced round colonies on cow blood but corpuscles near the colony are visible Alpha prime to weak beta.
8	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus, hemolytic, N.Y. 21288A. Identical with 3.	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta
9	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus, non-hemolytic. K 32. R. P. Identical with 6.			a	a	a	-	-	-	
10	F. S. Jones, Rockefeller Inst. for Med. Res., Princeton, N. J. Mastitis streptococcus, non-hemolytic. 7363. R. H. Identical with 5.			a	a	a	-	-	-	
11	J. Howard Brown, Johns Hopkins Univ. ag. 217. <i>S. mastitidis</i> .	a'	a'	a'	a'	a'	-	-	+	Alpha prime to weak beta
12	J. M. Sherman, Cornell Univ. #2. <i>S. mastitidis</i> .	a'	a'	a'	a'	a'	-	-	-	Alpha prime to weak beta

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF  
STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
13	J. M. Sherman, Cornell Univ. #5. <i>S. mastitidis</i> .			a'	a'	a'	-	-	-	Broad zones on cow blood
14	J. M. Sherman, Cornell Univ. #16. <i>S. mastitidis</i> .			a'	a'	a'	+	+	+	
15	Nat. Col. Type Cul. London, No. 3481. Originally obtained from Amer. Type Cul. Col. 4767.	a'	a'	a'	a'	a'	-	+	+	Alpha prime to weak beta
16	Nat. Col. Type Cul. London No. 3482. Amer. Type Cul. Col. 4170. Identical with 2.			a'	a'	a'	-	-	-	
17	Nat. Col. Type Cul. London, No. 3483. Amer. Type Cul. Col. 342. Identical with 1.			a'	a'	a'	-	-	-	
18	Nat. Col. Type Cul. London No. 3484. Amer. Type Cul. Col. 4768.			a	a	a	-	-	-	
19	Nat. Col. Type Cul. London No. 3444. F. C. Minett, Roy. Vet. Col. London, #6.			a'	a'	a'	-	-	-	
20	Nat. Col. Type Cul. London No. 3445. F. C. Minett, Royal Vet. Col. London, #32.			a	a	a	-	-	-	
21	Nat. Col. Type Cul. London No. 3446. F. C. Minett, Royal Vet. Col. London, #57.			a	a	a	-	-	-	
22	Nat. Col. Type Cul. London No. 3523. J. Howard Brown, Johns Hopkins Univ. Table 1. Group 2. No. 4. ( <i>J. Infect. Dis.</i> , 38, 381). Identical with 11.	a'	a'	a'	a'	a'	-	-	+	Broad zones on cow's blood. Alpha prime to weak beta
23	M. Klimmer, Veterinär-Hygiene-Institut der Univ. Leipzig. <i>Streptococcus agalactiae</i> #1.			a	a	a	-	-	-	
24	Ditto #2			a	a	a	-	-	-	
25	" #3			a'	a'	a'	-	-	-	
26	" #4			a	a	a	-	-	-	
27	" #5			a	a	a	-	-	-	
28	" #6			a'	a'	a'	-	-	-	
29	" #7			a'	a'	a'	-	-	-	
30	" #8			a'	a'	a'	-	-	-	
31	" #9			a	a	a	-	-	-	
32	" #10				a'	a'	-	-	-	
33	" #11			a	a	a	-	-	-	
34	" #12			a'	a'	a'	-	-	-	
35	" #13			a'	a'	a'	-	-	-	
36	" #14			a	a	a	-	-	-	
37	" #15			a	a	a	-	-	-	



TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
38	Ditto #16			a	a	a	-	-	-	Difficult to determine, zones narrow, but practically no cells close to colony in cow's blood. Alpha to weak beta
39	" #17			a	a	a	-	-	-	
40	" #18				a	a	-	-	-	
41	" #19			a	a	a	-	-	-	
42	" #20			a	a	a	-	-	-	
43	M. Seelmann, Preuss. Versuchs- und Forschungsanstalt für Milchwirtschaft, Kiel. <i>agalactiae</i> #5681			a	a	a	-	-	-	
44	Ditto #L124			a	a	a	-	-	-	
45	" #L114			a	a	a	-	-	-	
46	" #5682			a	a	a	-	-	-	
47	C. Stableforth, Roy. Vet. Col. London. <i>S. agalactiae</i> strain #6. Identical with 19			a'	a'	a'	-	-	-	
48	Ditto #57. Identical with 21			a	a	a	-	-	-	
49	" #84. " " 66	a'	a'	a'	a'	a'	-	-	-	
50	" #101 " " 67			a'	a'	a'	-	-	-	
51	" #108			a'	a'	a'	-	-	-	
52	" #111			a'	a'	a'	-	-	-	
53	J. M. Rosell, Institut Agricole d'Okla, P. Q. Canada, #1. Mastitis streptococcus			a	a	a	-	-	-	
54	Ditto #2			a	a	a	-	-	-	
55	" #3			a	a	a	-	-	-	
56	" #4			a	a	a	-	-	-	
57	" #5			a	a	a	-	-	-	
58	" #6			a	a	a	-	-	-	
59	" #7			a	a	a	-	-	-	
60	" #8			a	a	a	-	-	-	
61	" #9			a	a	a	-	-	-	
62	" #10			a	a	a	-	-	-	
63	" #11			a	a	a	-	-	-	
64	" #15			a	a	a	-	-	-	
65	Nat. Col. Type Cul. London. <i>S. agalactiae</i> , No. 3850. A. W. Stableforth, Roy. Vet. Col. London. ( <i>J. Comp. Path. &amp; Ther.</i> , 45, 195). Gr. I, Type Ia "49"			a'	a'	a'	-	-	-	

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar +0.05% glucose	Plain veal agar					
66	Ditto. #3851. Gr. I. Type Ib "84" Identical with 49.			a'	a'	a'	-	-	(+)	
67	Ditto. #3852. Gr. I. Type Ic #101 Identical with 50.			a'	a'	a'	-	-	-	
68	W. D. Frost, Univ. Wis. S. mastitidis, U. W. 20-2.	a'	a'	a'	a'	a'	+	+	+	Alpha prime to weak beta. Very broad zones on cowblood agar, but corpuscles present near colony.
69	Ditto. <i>Streptococcus mitis</i> , U. W. 26-2.			a	a	a	-	-	-	
70	Ditto. <i>S. mitis</i> , U. W. 3-4.			a	a	a	-	-	-	
71	Ditto. <i>S. mitis</i> , U. W. 24-2.			a	a	a	-	-	-	
72	Gminder, Württ. Tierärztliches Landesuntersuchungsamt. <i>S. agalactiae</i> . Allgäuer strain			a'	a'	a'	-	-	-	
73	Ditto. Maulbronn strain			a'	a'	a'	-	-	-	
74	" Stuttgart strain			a'	a'	a'	-	-	-	
75	K. Diernhofer, Tierärztliche Hochschule, Vienna. <i>S. agalactiae</i> , S II.			a	a	a	-	-	-	
76	Ditto. S I			a	a	a	-	-	-	
77	" R 6			a	a	a	-	-	-	
78	Ditto. Beta hemolytic in ox-blood agar, without glucose.	a	a	a	a'	a	-	-	-	An almost clear zone produced on sugar free cow's blood agar.
79*	K. Diernhofer, Tierärztliche Hochschule, Vienna. <i>Streptococcus dysgalactiae</i> .			a	a	a	-	-	-	
80*	Ditto. <i>Streptococcus uberis</i> .			a	a	a	-	-	-	
81*	Nat. Col. Type Cul. London, #3857. K. Diernhofer, <i>S. dysgalactiae</i> .			a	a	a	-	-	-	
82*	Ditto. #3858. K. Diernhofer, <i>S. uberis</i> .			a	a	a	-	-	-	
83*	Ditto. #3859. K. Diernhofer, <i>S.</i>			a	a	a	+	+	+	
84	E. Mejlbo. Københavns Torve- og Slagtehandler Copenhagen. <i>Streptococcus</i> from mastitis; strain, Bay.			a	a	a	-	-	-	
85	Ditto. Edelgave #156.			a'	a'	a'	-	-	-	
86	" " #1			a	a	a	-	-	-	
87	" " #87			a'	a'	a'	-	-	-	
88*	" Kragh.			$\beta$	$\beta$	$\beta'$	+	+	+	
89*	" Neo-Simonsen			$\beta$	$\beta$	$\beta'$	+	+	+	

TABLE I (Cont.)

HEMOLYTIC PROPERTIES OF REPRESENTATIVE AND AUTHENTIC STRAINS OF  
STREPTOCOCCI ISOLATED FROM CHRONIC OR SUBCLINICAL MASTITIS

No.	CULTURE	Type of hemolysis on blood agar plates					Hemolysis in broth culture			REMARKS
		Horse			Cow	Sheep	20 min.	1 hr.	3 hr.	
		Fermented veal agar	Plain veal agar	Veal agar + 0.05 % glucose	Plain veal agar					
90*	Ditto Simonsen			a'	a'	a'	+	+	+	
91	" Tryggevaelde			a'	a'	a'	+	+	+	
92	" Østrupgaard			a	a	a	-	-	-	
93	W. Steck, Universität Bern. <i>S. agalactiae</i> . #0113.			a'	a'	a'	-	+	+	
94	Ditto. #0148			a'	a'	a'	-	-	-	
96	" #065			a'	a'	a'	-	-	-	
97	" #0238			a'	a'	a'	-	-	-	
98	" #0203			a'	a'	a'	-	-	-	
99	" #0137			a	a	a	-	-	-	
100	N. Y. Agr. Exper. Sta. Geneva, N.Y. Subclinical mastitis. D13.			a	a	a	-	-	-	

\* Culturally found not to be *S. mastitidis*.

# Outbreak of Erythema Infectiosum in Elmsford, N. Y.

PHYLLIS SCHUYLER KERR, M.D.,

*Associate Attending, Skin Clinic, New York Post-Graduate Hospital,  
Columbia University, New York, N. Y.*

AND EDWARD H. MARSH, M.D., DR.P.H., F.A.P.H.A.

*Deputy Commissioner, Westchester County Department of Health,  
White Plains, N. Y.*

IN March, 1933, the Westchester County Health Department was asked to assist in the diagnosis of a case of erythematous eruption in a young child living in Elmsford, a village of 3,000 population. At the time a tentative diagnosis of erythema multiforme was made by one of us (E. H. M.). A few days later a similar case was seen by another member of the department staff and the same diagnosis made. Within the next few weeks the local public health nurse and school nurse discovered what seemed to be a rather extensive outbreak of the disease, confined entirely to children below the age of adolescence. With the knowledge of the occurrence of so many cases all confined to one age group, the diagnosis of erythema multiforme seemed to be out of the question. The nurses were asked to gather together as many of the cases, both new and old, as could be found for reëxamination by both of us.

On April 28 about 20 cases were brought together, the youngest 3 years of age, the oldest 13. All had had the eruptive disease during the previous 4 weeks and all but one or two showed signs of the eruption. The eruption consisted of a (subjectively) asymptomatic reticulated erythema found in nearly all cases on the arms and legs; in a few the upper trunk and neck were also in-

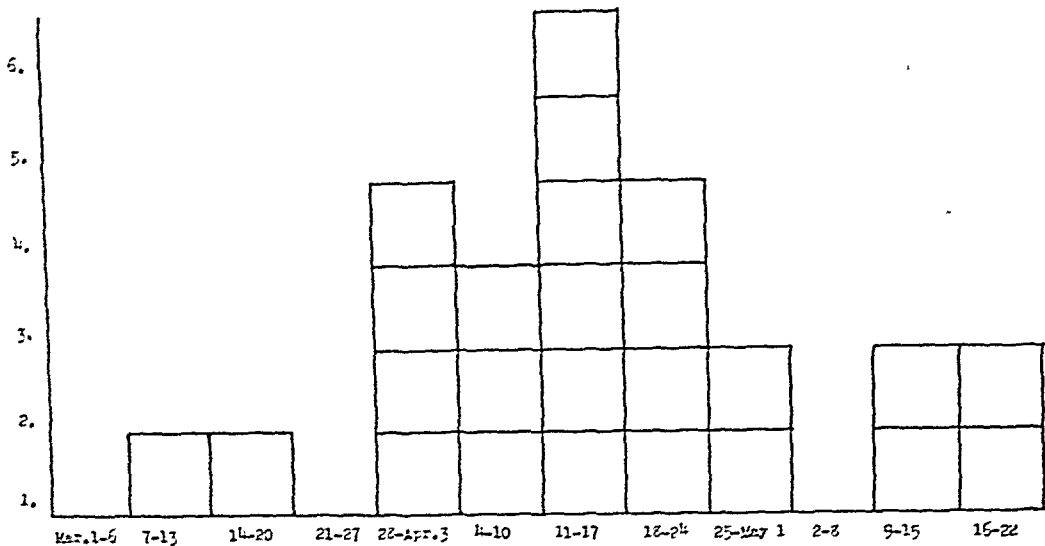
involved, while in one or two there was distinct flushing of the cheeks. In one of the cases seen earlier there had been in addition to the distribution described, a distinct butterfly patch across the nose, extending to the malar eminences. A very few of the children had signs of chronic tonsillar infection; some of the more recent cases showed redness of the fauces and tongue; while in one fresh case there were distinct well marked patches on the tonsillar pillars and buccal mucosa. Such conditions were exceptional, however, oral manifestations not being noted in most cases; nor was there any history of sore throat in the majority.

As a result of this reëxamination it was determined that the outbreak was one of erythema infectiosum (Ringel-röteln), (Fifth Disease). The first clinical report of this malady was in 1925, by Herrick,<sup>1</sup> who recorded in a most complete article 74 cases. He stated that the disease was accurately described in the German literature in 1886, was recognized as a distinct entity in 1896, and given the name "Erythema Infectiosum" in 1899. There have been reported epidemics of the disease in Germany, Italy, France, Netherlands, Manchuria, and in the United States in Utah, St. Louis, Cleveland, Albany, Hamburgh, N. Y., and Branford, Conn.

CHART I

25 CASES OF ERYTHEMA INFECTIONISUM, ELMSFORD, N. Y. 1933

Distribution by Week of Onset



The description of the disease recorded by Smith<sup>2</sup> conforms closely to the eruptions observed by us. With no prodromal symptoms the eruption appears on the face, chiefly the cheeks, in the form of a bluish-red flush, rather sharply demarcated and on close inspection is seen to be composed of macular elements. Sometimes a distinct butterfly patch is observed. At first glance the eruption resembles erysipelas although it is readily seen that there is no induration nor co-lateral edema. There may be a burning sensation with possible itching<sup>2</sup> (absent in all of our cases). On the second day the eruption appears on the outer surfaces of the arms and legs, the buttocks, and less often on the trunk. The rash spreads peripherally and as it fades in the central portions, gyrate map-like mottling remains which often persists for as long as 3 weeks, following the initial eruption. The duration varies from a few days to several weeks, sometimes fading almost completely only to return, fade and return many times. A brisk rubbing often makes the rash

more noticeable. Shaw<sup>4</sup> describes an evanescent vermilion coloring of the tip and edges of the tongue which may appear and disappear during the course of an examination.

There is no lymphadenitis and seldom any fever, at times there is slight temporary gastrointestinal disturbance and occasionally redness of the throat has been observed. The leucocytes may at first be diminished and then slightly increased, the eosinophil count ranging from 5 to 10 per cent.

The disease is of unknown etiology. It is unquestionably infectious and communicable but the symptoms are of so little moment that isolation is not warranted and no treatment is required. It occurs mainly among children of from 4 to 12 years of age and apparently is more common in the spring and summer months. The incubation period seems to be from 4 to 14 days.

Erythema infectiosum must be differentiated from erysipelas, German measles, scarlet fever, measles and erythema multiforme.<sup>5</sup>

This report is of interest chiefly in

adding another place to the list of communities in which erythema infectiosum has been identified and in recording such limited epidemiological data as were discovered, although much of this is of a negative character.

The present series of cases totalled 25 and the likelihood of there having been any considerable number of unobserved cases is slight. The local physicians were on the alert for the disease and the public health nurse and school nurse of the village were in touch with almost every family in the community. Indeed, it was only through their efforts that this group of cases was assembled. The age distribution was from 3 to 13 years, most of the group being under 10 and nearly one-third under 6 years of age. The cases were distributed almost evenly as to sex.

The outbreak extended over a period of 11 weeks, the first case having had its onset March 10, the last 2 during the third week of May. The week during which the largest number of cases occurred was that of April 11-17, the sixth week of the outbreak. The accompanying chart shows the cases by week of onset. It is apparent that the evolution of the outbreak was gradual and that its subsidence was equally slow, showing that there was probably no common source of infection and that in all probability the disease spreads by contact.

There were 4 instances of multiple cases in one family. In the first family 1 child's onset was March 18, the other April 3, a 16-day interval; in the second the onset in 1 child was April 16, in the other 4 days later; in the third there was a 4-day interval between cases; in the fourth family 2 of the cases occurred simultaneously on April 13, the third case 8 days later. In addition to these 1 child whose onset was March 18 lived next door to and played with the child whose onset was March 10. These intervals correspond closely to

the belief previously noted that the incubation period is from 4 to 14 days.

In the two schools in the village there was practically no difference in incidence among the pupils. Most of the children came from clean houses and from families of moderate means. The cases were scattered irregularly throughout the village, there being no well defined geographic concentration.

As to possible etiology, no logical cause was discovered. This is consistent with the intensive investigation and careful clinical reports by Lawton and Smith,<sup>6</sup> in 1931. The water supply of Elmsford is of good sanitary quality and is secured from the Catskill aqueduct, part of the New York City supply. All of the milk sold in the village is produced and distributed under the supervision of the Westchester County Department of Health and is obtained chiefly from two of the largest distributors covering New York City and the surrounding suburban territory. Furthermore the distribution of cases was such that no one milk supply could possibly be implicated. Most of the usual foods supplied to the residents of the village, were secured from one or another of several chain stores operating in the community. Evidence suggesting any one store or any one food as the source of the outbreak was lacking. About 25 per cent of the village is sewered, the residents of other property relying on cesspools or septic tanks for sewage disposal; there are few, if any privies. There is no evidence of correlation between the cases and the method of sewage disposal.

Both whooping cough and chicken pox were prevalent in the community during the time of this outbreak, but apparently the cases of erythema infectiosum were not more common among the children who had either of these diseases or had been exposed to them. It was suggested that immunization against diphtheria by toxoid, or the use

of pertussis vaccine in the treatment and prevention of whooping cough might have been causative factors, but only 2 of the cases in our series had had any such treatment during the few months immediately preceding the outbreak.

#### SUMMARY

During the spring of 1933, an outbreak of erythema infectiosum occurred in the Village of Elmsford, Westchester County, N. Y. There were 25 cases ranging in age from 3 to 13 years. The outbreak extended over a period of 11 weeks and apparently was spread by contact infection. Evidence pointing to any definite etiology is negative. The disease is characterized by a typi-

cal eruption accompanied by few, if any, other symptoms. From a study of the literature and this present outbreak it would seem to be logical to believe that outbreaks of this disease may be fairly common but unrecognized.

#### REFERENCES

1. Herrick, Theodore. Erythema Infectiosum. *Am. J. Dis. Child.* 31:487, 1926.
2. Smith, Eugene. An Epidemic of Erythema Infectiosum, The Fifth Disease. *Arch. Pediat.* 46:456, 1929.
3. Strümpell, Adolph. Erythema Infectiosum. *The Practice of Medicine* 1:89, 1931.
4. Shaw, Henry L. Erythema Infectiosum. *Abt's Pediatrics* V:661, 1924.
5. Erythema Infectiosum (Megalerythema). *Handbuch der Haut und Geschlechtskrankheiten. J. Jadassohn.* Vol. XIV, p. 454. Julius Springer, Berlin, 1930.
6. Lawton, A. L. and Smith, R. E. Erythema Infectiosum. *Arch. Int. Med.* 47:28, 1931.

# Pulmonary Asbestosis\*

J. DONNELLY, M.D.

*Mecklenburg Sanatorium, Huntersville, N. C.*

THE manufacturing of asbestos products in the last few years has assumed a somewhat greater importance in the industrial world. Although the total number of workers in asbestos mills is probably far smaller than in many other lines of trade, their health is of paramount importance. The conditions surrounding the greater proportion of the employees constitute a distinct and serious industrial hazard, and often sufficient devices for protection have not been provided. It is doubtful if any single employee in certain departments of these mills can possibly escape some damage to his respiratory system because of the unavoidable inhalation of asbestos dust. Naturally, the longer the service of an employee, the more certain is more or less extensive pulmonary damage.

Asbestos is composed principally of magnesium silicate in crystalline hydrated form, always found with other minerals, particularly iron and magnetite, and usually contains about 2.6 per cent free silica. The rock is blasted in open quarries, being afterward crushed and pulverized, although often the pulverizing is done at the mill where the finished product is produced. At the mill the fibers are mixed with other fibers, usually cotton, then carded and spun by processes very similar to those employed in the production of cotton goods. In all of these processes a considerable quantity of asbestos dust is

produced. Cooke states that the asbestos fiber microscopically consists of two different elements, (1) the glistening material which constitutes the bulk, and (2) black opaque angular particles. The dust contains these particles and minute granules. Analysis of samples showed that the dust with the greater quantity of these black particles contained the largest amount of iron. As the dust contained 18.4 per cent of iron and the finished product only 0.1 per cent, Cooke concluded that the black brittle parts of the fiber are the cause of the dust, and the danger to the health of the workers. Since the asbestosis bodies found in the sputum of disabled workers have been found to have cores which appear to be asbestos fibers around which has been deposited some kind of material from the living tissues, the iron-containing particles cannot be the sole cause of the condition. In fact, Gloyne, in 1929, showed that the core of the "asbestosis body" is an asbestos fiber.

The "dusty trades" for a long time have been considered inimical to the health of employees. In spite of this it has only been within the last 10 years that "pulmonary asbestosis," a disability resulting from working in one of the dustiest of trades, has been to any appreciable extent recognized. The first recorded case of "asbestosis" was reported by Dr. H. M. Murray at Charing Cross Hospital in 1900, and his diagnosis was supported by necropsy findings. The man was the only survivor of 10 who had worked in the carding room of an asbestos mill 10 years

\* Read before the Industrial Hygiene Section of the American Public Health Association, at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.



previously. From 1900 to 1924 not a single case report of the condition appears in the literature. In 1924 Cooke<sup>1</sup> published an autopsy report on a case who had worked in an asbestos plant for 20 years. Cooke thought this was the first case to be reported. After having learned of Murray's case, in 1927, he wrote a second article describing in more detail the pathological findings in his case.

McDonald,<sup>2</sup> in 1927, published an article on the microscopic appearance of lung tissue in asbestosis, his material having been obtained from Cooke's case. In 1928, Simson<sup>3</sup> reported the findings in lung sections from 4 asbestos workers, 2 of whom died from pulmonary tuberculosis and 2 from pneumonia. The author discussed at length the "golden-yellow bodies" now known to be pathognomonic of asbestosis. Page and Wood,<sup>4,5</sup> in 1929 and 1930 recorded 2 autopsies. Lynch and Smith<sup>6</sup> reported the complete autopsy findings in a case which apparently died of pulmonary asbestosis, and had previously reported 2 autopsies on asbestos workers, 1 of whom died of gunshot wounds and the other of lobar pneumonia. They had been able to find only 172 cases of pulmonary asbestosis in the literature up to 1931, and post-mortems had been made in only 18 of these, 9 of which were complicated by other diseases and 1 a traumatic death. Since 4 reports were not completed, there remained at that time (1931) only 4 records of uncomplicated pulmonary asbestosis.

Since 1931 the reports of cases diagnosed as pulmonary asbestosis have been more or less fragmentary, being, in the main, adaptations of pathological facts from the previous post-mortems to the individual diagnosis in each case. Special stress has continuously been laid on the finding of "asbestosis bodies" in the sputum in order that the diagnosis may in no way be doubtful.

The principal pathological findings are pleurisy, extensive fibrosis in the parenchyma of the lung, usually over the mid-portions and bases, and the contraction of the lungs due to this fibrosis. The finding of asbestos fibers and asbestosis bodies is a usual feature, although they cannot always be demonstrated in the sputum of the living case. The fibrotic changes in the lung are the result of the low-grade inflammatory reaction caused by the asbestos fibers, which are supposed to act both as a mechanical and a chemical irritant. The mechanical irritation is evidenced by the large amount of granular dust and the larger angular particles found in microscopic sections. The chemical action is probably due to the presence of silicic acid, or silica, in the mineral, which is usually estimated at 2.6 per cent. Asbestos is very slightly soluble, and the formation of asbestosis bodies and pulmonary fibrosis are supposed to be due to this irritant action.

Gardner and Cummings<sup>7</sup> studied the production of experimental asbestosis in animals. Guinea pigs, rats, and rabbits were exposed to heavy concentrations of asbestos dust for varying periods, some as long as 2 years. In guinea pigs killed after 847 days of exposure, as well as some with a much shorter term, the authors found that the dust did not reach further than the bronchioles, whereas other dusts are usually deposited in the terminal air sacs and alveoli. This difference in localization they decided was due to the fact that asbestos dust is invariably principally elongated fibers. Along the bronchioles more or less mild inflammatory reaction was found, and fibrous tissue was formed after 1 to 2 years' exposure. After 782 and 840 days' exposure the pleura was involved with sub-pleural grayish white nodules 1 mm. in diameter, pleurisy being frequent in animals which had been long exposed. After 1 year's exposure the X-ray films

of guinea pigs showed definite pathological changes of a fibrotic character. Asbestosis bodies were found to be abundant in the regions around the bronchioles, but less so elsewhere. The condition appeared to follow the course of a slowly spreading fibrosis, even when not complicated by a tuberculous infection.

The so-called "asbestosis bodies," which are usually considered pathognomonic of asbestosis, are never found in crude asbestos. They are invariably found in lung sections, from expressed lung juice, and very frequently in the sputum of patients. They are undoubtedly formed by the deposition of certain material around the inhaled asbestos fibers. Fissures form in this material and the body separates into segments. More than 40 different varieties have been found, varying from golden-yellow to a mahogany-brown. They do not stain with the ordinary tissue stains, but frequently give the Prussian-blue reaction for iron, probably because of iron derived from the tissues. The bodies may be found in the centrifuged material from sputum which has been digested with 10 per cent sodium hydrate, and they vary considerably in length and breadth as they do in form. They are often found with one or both ends encased in phagocytic cells, and frequently phagocytes are seen containing fragments. It has been demonstrated by dissolving the bodies in concentrated sulphuric acid that the middle is composed of actual asbestos fibers, which are very slightly soluble.

The symptoms and physical signs of pulmonary asbestosis simulate to a considerable degree those of fibroid tuberculosis, or atrophic pulmonary emphysema, and because of this many of these cases have previously been diagnosed pulmonary tuberculosis. A few of them are complicated by a tuberculous condition, but not by any means as fre-

quently as in silicosis. No conclusive proof that asbestosis renders an individual more susceptible to an active tuberculous infection has been given. In my series of cases I have been unable to deduce any proof that the condition has any tendency even to cause an exacerbation of activity in an old tuberculous process. The symptoms of the condition, with the exception of dyspnea, are rarely extreme. The skin frequently has an unhealthy somewhat sallow hue, and occasionally, especially in cases with long exposure to inhalation of the dust, one notices slight clubbing of the fingers, although this is far from constant. There is loss of appetite and often slowly progressive loss of weight, with accompanying lassitude. These patients almost invariably complain of chest pains, due to the tendency of the condition to involve the pleura. The cough is variable, often not excessive, and the sputum is usually scanty, being of a tenacious mucoid character. There may be blood-streaked sputum, or definite small hemorrhages, but this occurrence is fortunately not frequent. The temperature as a rule is not elevated to any appreciable extent. The most prominent and distressing symptom is dyspnea, which, very frequently, is extreme. In fact, this symptom usually first calls to the attention of the patient his need of medical attention, and renders him incapable of earning a livelihood. Sometimes, especially after an exposure over a period of years, the dyspnea grows progressively worse even though there has been a cessation of exposure for a considerable period of time. Occasionally this symptom is so distressing that it precludes any form of muscular exertion.

The physical signs of pulmonary asbestosis are principally those of pulmonary fibrosis, usually considerably more extensive over the lower two-thirds of the lungs. There is frequently some muscular atrophy over the chest,

and expansion is very much restricted. The percussion note over the whole chest is higher-pitched than normal except in the apices where the note is frequently resonant, probably because of compensatory emphysema. Although invariably bilateral, the impairment of resonance is more marked on the right side. The physical signs on auscultation are diminished to feeble breath sounds, prolonged and roughened expiration, and either dry crackles, moist râles, or both, usually over the lower half or two-thirds of the lungs. On the whole, the physical signs are quite similar to those found in uncomplicated silicosis, fibroid tuberculosis, or atrophic pulmonary emphysema. There are no definite physical signs distinctive of the condition. Signs are supposed to develop in less than 10 years' exposure, but they are frequently discovered within 2 years. The shortest time in my series of cases, from exposure to the development of symptoms and physical signs, was 18 months. The continuously progressive cases often develop extensive bronchiectasis, or engorgement of the right heart with progressive heart failure as a terminal result. Bronchopneumonia is frequently a serious complication.

The X-ray films show a somewhat distinctive picture. According to Merewether,<sup>8</sup> if films of asbestosis subjects be compared with those of victims of silicosis, the amount of disease in the former will be underestimated, because of inherent differences in the underlying pathology. The nodular distribution of the fibrosis in patients with silicosis is not often found in asbestosis. In the earlier stages of asbestosis the films present what has been frequently called a ground glass appearance. Later there is more definite mottling, but the lesions are never as dense as those of silicosis; consequently, it is difficult to divide the progress of the condition into stages. Stereoscopic

films show that the ground glass appearance is caused by the development of a very fine fibrosis, and this is almost invariably seen to be much more extensive in the basal portions of the lungs.

Evidence of pleuritic involvement is often indicated by obliteration of the costo-phrenic angles, and flattening or peaking of the diaphragm. Often the diaphragm is indistinct in outline. The films sometimes show some thickening of the parietal pleura. The outline of the heart shadow is often "shaggy," the degree depending on the length of time of exposure to the dust. Occasionally calcareous deposits are seen not only around the hilum of the lung, but scattered in the parenchyma as well. On the whole, in well advanced cases of asbestosis, X-ray films do not show the amount of pathological change that one would expect from the clinical signs and symptoms. Even the most severe cases do not show such definite X-ray evidence as is seen in silicosis, although the area of involvement is usually somewhat extensive.

During the past 3 or 4 years I have collected 15 cases of asbestos workers who have been referred to our chest clinic because of symptoms referable to the respiratory system. With one exception, these have had a diagnosis of pulmonary tuberculosis. Invariably their principal and most distressing symptom has been dyspnea, in combination with slight or more severe cough, lassitude and progressive although gradual loss of weight.

Having had occasion some years ago to familiarize myself with the conditions in asbestos factories, I have since been intensely interested in determining the extent of the industrial hazard in this type of work. For that reason I have attempted to obtain X-ray films of the lungs of all asbestos workers who have been referred to the clinic because of respiratory symptoms. Of the films taken, only 3 have failed to exhibit

some definite evidence of the condition called pulmonāry asbestosis. Although this series is comparatively small, it seems reasonable to conclude that this condition is far more frequent among asbestos workers than is usually supposed, in spite of the increased attention paid to the condition in the past 4 or 5 years.

Case histories with the X-ray films of 3 patients may be of interest. All of the cases are still living, although totally disabled. I have not been able to demonstrate asbestosis bodies in the sputum, which should not be absolutely necessary for a diagnosis when the X-ray film shows unmistakable pathology, and the physical signs indicate more or less widespread involvement.

*Case I*—D.S.W., white male, age 64 years. Came under observation Jan. 8, 1929. His complaint for 6 months had been cough and dyspnea, combined with anorexia and loss of weight. He had worked for 18 months in the card room of an asbestos plant with no protective devices. He had considerable cough, although the amount of sputum was not large and was negative for tubercle bacilli. There was a history of only a very slight rise of temperature at any time. There was slight hoarseness at times. The expansion was noticeably deficient over the whole chest and the resonance was slightly impaired over the lower lobes. The breath sounds were prolonged anteriorly over the mid-portion of the lungs, and, posteriorly, from the middle of the scapula to the base. Over the latter region there were many dry crackles and moist râles.

The X-ray films showed considerable thickening around the hili. The heart outline was shaggy, and both costo-phrenic angles were obliterated. The diaphragm was irregular and indefinite in outline. The lower two-thirds of the lungs were hazy and infiltrated with fine fibrous lines, and over the left base there was a considerable area of fairly heavy mottling.

This patient was put on complete rest for 5 months, during which he gained 30 pounds. At this time (4 years after becoming incapacitated) he is working as night orderly in a tuberculosis sanatorium, but his cough and dyspnea show no improvement. X-ray films show no clearing of the condition. He suffers at rather frequent intervals with

chest pains, and about 3 months ago had an attack of fibrinous pleurisy with a rise of temperature to 102°.

*Case II*—C.A.B., white male, age 73 years. Patient appeared at clinic June 13, 1931, with cough and distressing dyspnea; had lost a few pounds, and had the appearance of a very ill man. He had worked practically continuously in the card-room of an asbestos plant for 8 years, but had been compelled to quit work about 6 weeks before on account of extreme weakness and shortness of breath.

The paroxysms of dyspnea, even on the slightest exertion, were severe. Talking apparently required considerable effort. Expansion was much deficient over the whole chest, the intercostal spaces being drawn inward on inspiration. Resonance was impaired over the lower two-thirds of both lungs, and the expiration was prolonged and roughened from the apex to base on both sides. There were dry and moist râles anteriorly from the 3rd ribs downward and posteriorly on both sides from apex to base. The breath sounds were considerably diminished over both lower lobes posteriorly.

X-ray films present a fairly typical picture of asbestosis. The right costo-phrenic angle is obliterated and the right leaf of the diaphragm is irregular in outline and peaked by adhesions. The left costo-phrenic angle is partially obliterated. The lung fields present the ground glass appearance. Around both hili are numerous apparently heavily calcified areas, and there are several such small areas scattered through the parenchyma of the lung. Stereoscopic examination of the films shows a fibrotic involvement of both lungs which is much more extensive over the lower lobes. In both bases there are fairly extensive areas of heavy mottling.

This patient, 2 years after the condition was first recognized, is still living, but his symptoms have in no way improved, and he remains totally incapacitated. The eventual fatal result by progressive cardiac failure appears to be inevitable.

*Case III*—R.G.J., white male, age 31 years, was admitted into the sanatorium on April 21, 1930, with a diagnosis of pulmonary tuberculosis. His complaints were lassitude, loss of weight, and cough, which symptoms had been gradually growing worse for 1 year. He had lost about 30 pounds, and, on account of weakness and shortness of breath, had been compelled to quit his work about 4 weeks before. His daily temperature, he stated, had not exceeded 100° F. He had worked in the card-room of an asbestos mill, in which there were some protective devices, for about 4 years.

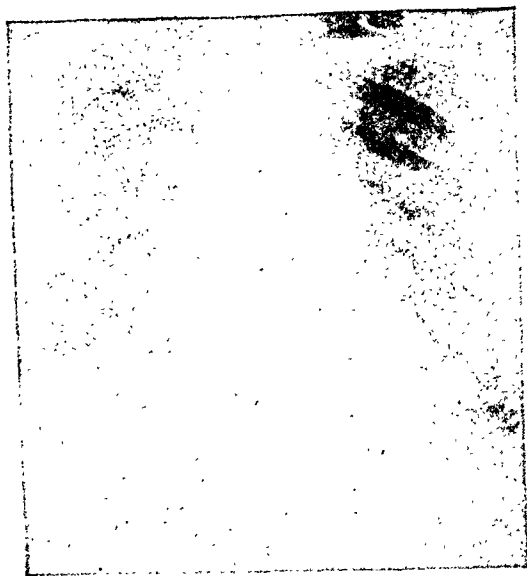


FIGURE I. CASE 1 Pulmonary Asbestosis  
Roentgenogram, June 13, 1931

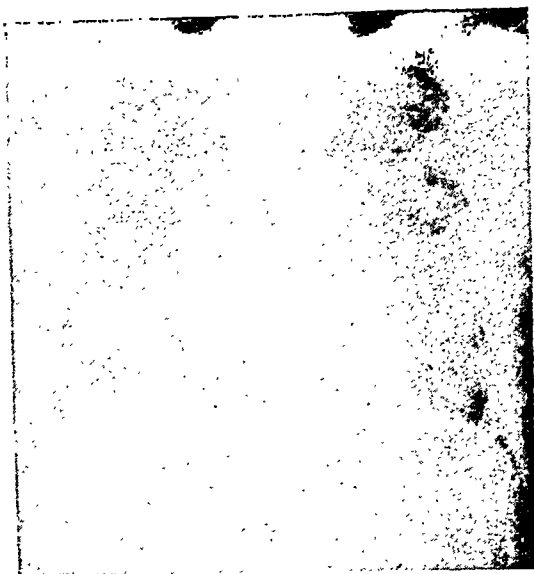


FIGURE II. CASE 2 Pulmonary Asbestosis  
Roentgenogram, June 13, 1931

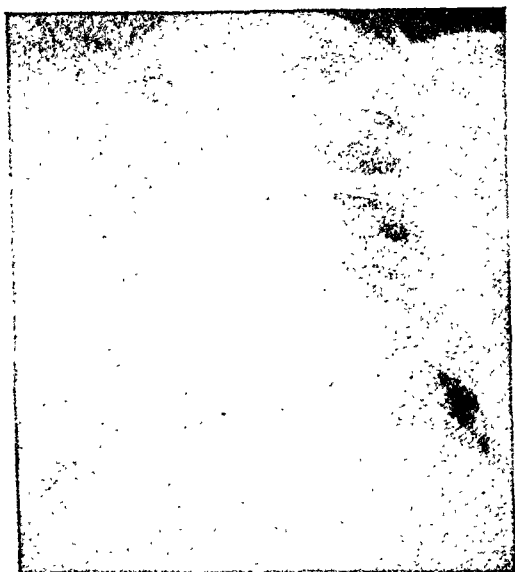


FIGURE III. CASE 3(A) Pulmonary Asbestosis  
Roentgenogram, April 23, 1930

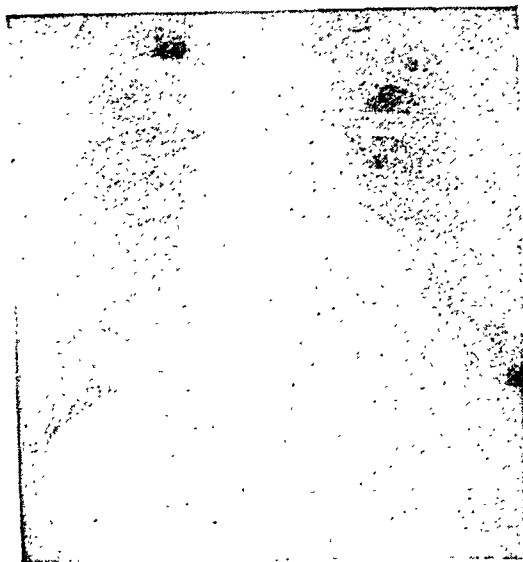


FIGURE IV. CASE 3 Pulmonary Asbestosis  
Roentgenogram, September 2, 1931

The man was thin (weight, 127 lbs.) and his skin sallow. The clavicles were prominent and there was poor expansion over the whole chest. The resonance was impaired over both lower lobes; expiration was prolonged and roughened over the mid-portion of the lungs anteriorly, and from the 3rd to the 9th dorsal spines posteriorly. There were moist râles on the left side anteriorly from the 2nd to the 4th ribs, and posteriorly on both sides from the 4th to the 9th dorsal spines. The breath sounds were much diminished over the bases. The sputum was negative for tubercle bacilli. No asbestosis bodies were found in the sputum.

X-ray films taken March 23, 1930, show both costo-phrenic angles partially obliterated. The heart outline is somewhat shaggy, and

there is much thickening around the hilum. Throughout both lung fields is a snow-flake mottled density, which is much heavier on the right from the 5th to the 8th ribs anteriorly.

This patient was kept in the sanatorium for about 13 months, during which time his appetite and digestion improved considerably and he gained 38 pounds. His temperature, never over 100° F., became normal after about 6 weeks' rest and remained so until his discharge. His cough improved considerably, but at discharge he was still troubled with dyspnea. X-ray films of his lungs taken Sept. 2, 1931, 15 months after the first films, show an increase in the characteristic fine fibrosis. This is particularly noticeable over the right base over the area which showed in the first

films as a heavier shadow. The heart is more shaggy in outline, the diaphragm is flattened on both sides, and there is apparently increased retraction of the lower ribs. Although the patient appeared to have remained in good physical condition, the X-ray films indicate some increase in pathology. This man is still living, but remains incapable of continuing remunerative employment for any length of time.

These cases are typical of the condition found in each patient of the series, and, from the symptoms and X-ray findings, it seems justifiable to assume that the exposure to asbestos dust is the cause of their total and permanent disability. That exposure to the inhalation of this dust for even a comparatively short time is a definite and serious industrial hazard, has been too frequently indicated to be open to doubt. The fact that the condition when once acquired is permanent and more or less rapidly progressive is most important from a public health viewpoint. It also seems to be the consensus of opinion, not only among writers on the subject, but also among the asbestos workers, that the protective devices now in use in many plants are most inadequate.

The compensation laws in North Carolina do not list this disability as entitling the worker to proper remuneration, and I presume that legal status obtains in other states. In England, in 1931, the Asbestos Industry Regulations were made legally mandatory. These Regulations require the substitution of wet methods for dry, the enclosure of dust producing machines, the substitution of enclosed mechanical methods for hand conveyance and for dusty hand work generally, and the installing of exhaust drafts at dust producing points. In the same year it was also made obligatory for workmen in asbestos plants to appear for periodic medical examinations as a means of preventing or arresting the development of asbestosis.

If any similar regulations have been adopted in this country I am not familiar with them. Asbestos factories produce various necessary and valuable articles of commerce, and are, consequently, important parts of our industrial system. For that reason, if for no other, the workers should be provided with every facility for the protection of their health, so that they may earn a livelihood for themselves and families, for at least an average period of time, at the occupation in which they are most skilled. Unfortunately, every worker handicapped by pulmonary asbestosis becomes almost invariably physically incapable of engaging in *any* occupation, and many of them become an added expense to the welfare agencies of the community. Although the number of asbestos workers is much less than that in many other industries, their occupation is extremely hazardous, and they are amply justified in expecting whatever protection it is possible to give them. Furthermore, the fact that efficient protective devices in this industry, in spite of the added expense, will effect a substantial financial saving, is becoming more apparent. The workers themselves are becoming informed of the danger to health, and many civil suits for damages against factory owners are the result.

## REFERENCES

1. Cooke, W. E. Fibrosis of the lungs due to inhalation of asbestos dust. *Brit. M. J.*, ii:147, 1924.
2. McDonald, S. Histology of pulmonary asbestosis, *Brit. M. J.*, ii:1025, 1927.
3. Simson, F. W. Pulmonary asbestosis in South Africa, *Brit. M. J.*, i:885, 1928.
4. Wood, W. B., and Page, D. S. A case of pulmonary asbestosis, *Tubercle*, x:459, 1929.
5. Wood, W. B., and Page, D. S. A case of pulmonary asbestosis, *Tubercle*, xi:157, 1930.
6. Lynch, K. M., and Smith, W. A. Pulmonary asbestosis, *Am. Rev. Tuberc.*, xxiii:643 (June), 1931.
7. Gardner, L. U., and Cummings, D. E. Inhalation of asbestos dust. Its effect on primary tuberculous infection, *J. Indust. Hyg.*, xiii:65 and 97, 1931.
8. Merewether, E. R. A. The occurrence of pulmonary fibrosis and other pulmonary infections in asbestos workers, *J. Indust. Hyg.*, xii: 198 and 239, 1930.

# Has Diabetes Become More Prevalent?\*

CHARLES BOLDUAN, M.D., F.A.P.H.A.

*Director, Bureau of Health Education, Department of Health,  
New York, N. Y.*

PRACTICALLY all the textbooks on the practice of medicine published 60 or 70 years ago speak of diabetes as a rare disease, and more common among men than women. At present every physician encounters cases of diabetes, and the disease is known to be very common. Mortality statistics generally show a marked increase in the registered mortality rate of diabetes during the past 50 or 60 years, an increase which has been especially great among women. Do these facts indicate that diabetes has really become increasingly prevalent? This is not an academic question. If the disease has really become more prevalent we should seek for the causative factors with a view to combating any which are preventable.

Prior to the middle of the last century the presence of sugar in the urine was detected (a) by the sweet, honey-like taste of the urine, and (b) by the formation of sugar crystals when a drop of urine was allowed to evaporate on a glass slide. No wonder that one of the older authors speaks of the repugnance which physicians had for testing the urine by taste. Trommer's qualitative chemical test for sugar was introduced in 1842, and Fehling's quantitative test in 1848. A careful study of the medical histories of New York Hospital indicates that even 30 to 40 years after these simple tests were available, no routine tests for

sugar were made of the urine of medical patients. Not until some time between 1880 and 1890 was this present-day routine procedure introduced in this leading hospital. Undoubtedly the general practitioner lagged far behind. The conclusion is justified that diabetes was not recognized because it was not suspected, and because routine tests of the urine for sugar were not made. The textbook teaching that diabetes was a rare disease fostered this neglect to look for diabetes.

## MORE COMMON AMONG MALES?

A considerable proportion of cases of diabetes has been discovered accidentally as the result of urine tests made in connection with life insurance. Data collected by the writer show that during the past 30 years the proportion of women examined for life insurance has trebled. Moreover the total number of policy holders, both male and female, has increased enormously during this period. The entrance of a large army of women into industry and the extension of industrial medical services have also increased the proportion of women whose urine has been tested for sugar. There is no convincing evidence that 40 or 50 years ago diabetes was really less prevalent among women than men. It is more reasonable to believe it was merely detected less frequently.

\* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 19, 1933.

## SIGNIFICANCE OF THE INCREASING REGISTERED MORTALITY

Because of the preference given to

diabetes in the classification of deaths due to joint causes, the increasing mention of diabetes on the death certificates (due, in turn, to an increasing recognition of the disease) has resulted in a rapidly mounting death rate charged to diabetes. Much of this increase is fictitious, for many of the deaths represent merely the death of a diabetic individual from some other cause. With a further increased recognition of cases of diabetes, the registered mortality may be expected to rise still higher so long as this statistical practice continues, and this, in spite of the fact that through better treatment, deaths truly chargeable to diabetes decline in frequency. Mortality statistics of diabetes must therefore be used with the greatest caution and with an appreciation of their marked limitations.

#### OUR AGING POPULATION

Since diabetes develops most commonly after middle life, the aging of our population (because of the declining birth rate and the cessation of immigration) has a marked influence in increasing the prevalence of diabetes. In New York City the proportion of persons over 45 years of age in the population has increased approximately one-third during the past 30 years.

In New York City another factor has led to an increased prevalence of diabetes; namely, the relative increase in the Jewish population. In 1900 this group was about 17 per cent of the city's population; in 1930 it was approximately 30 per cent. Studies by Weiner, of the Department of Health, indicate that diabetes is considerably more prevalent among Jews than non-Jews.

#### PREVALENCE OF DIABETES

Diabetes is much more prevalent than is generally believed, but inasmuch as the disease is not reportable, no figures are thus far available. The writer has

undertaken to determine the incidence of diabetes in New York City by means of sampling, using for this purpose the results of urine examinations of patients admitted to the state hospitals for the insane, from the New York Metropolitan area. The compilation must, of course, be made by age and sex. Life insurance statistics as well as incidence studies from general hospitals are open to the objection that the individuals represent selected groups. A large body of statistical material from state hospitals for the insane seems best adapted to throw light on the prevalence of diabetes, and it is therefore recommended that health officers throughout the country collect such information from these institutions.

The writer believes that, aside from the increased prevalence of diabetes due to the aging of the population, an increase which must be accepted as real, (and in New York City also the increase due to the larger proportion of Jews in the population), diabetes was probably about as prevalent 50 years ago as it is now. He feels that the increase, during the past 30 or 40 years, in the diabetes mortality in the various age groups finds an adequate explanation in the more frequent recognition of the disease in recent years. In this connection one should remember the attention drawn to diabetes by the work of Allen, and especially by the discovery of insulin by Banting and Best in 1921.

#### OVEREATING OF SUGAR AND OTHER FACTORS

If it be accepted that, apart from the effect produced by the aging of the population, diabetes really has not become more prevalent during the past 50 years, it will be clear that we should not charge the rising diabetes mortality rate to the increased per capita consumption of sugar, or to some other alteration in our diet, or to some marked change in the relation between



our expenditure of physical energy and our food intake. All of these alleged factors have their advocates. Certainly it would be difficult to explain why these factors should affect the mortality rate of females exclusively, for when due allowance is made for the age factor, the increase is limited to diabetes deaths in females. .

One of the chief problems facing

health administrators is the difficulty of dealing with the diseases of later life. Because of the amenability of diabetes to treatment and the experience of physicians in prolonging the lives of their diabetic patients, the wider recognition and the proper treatment of cases of diabetes will help to increase the expectancy of life in the higher age groups.

---

## School Medical Inspection in Madrid

THE introduction of medical inspection in the public elementary schools of Madrid as a beginning of a nation-wide system was ordered in a decree of June 5, 1933.

The decree prescribes the appointment, following a competitive examination, of 34 physicians and 23 nurses; some of these physicians and nurses will make the physical examinations of the children in the schools; the rest will constitute the staff of a dispensary for school children which will be established in Madrid.

All the physicians in the school medical inspection service will constitute a

technical board. This board is to make studies and prepare reports at the order of the Minister of Public Education and to suggest necessary measures.

The work will be under the supervision of a chief medical inspector appointed by the Minister of Public Education, who will also be the chairman of the technical board. Graduate courses will be established for the physicians who are to serve as school medical inspectors when such inspection is introduced in the other cities of Spain. Detailed regulations for the functioning of this system will be issued at a later date.—*Gaceta de Madrid*, June 7, 1933.

# Significance of Copper and Iron in Blood Restoration\*

C. A. ELVEHJEM, PH.D.

*University of Wisconsin, Madison, Wis.*

DURING the past few years much attention has been given to the iron and copper content of foods and to iron and copper preparations used for blood restoration. It is logical for us to ask, what is the practical significance of these studies? and how much consideration must we give to the supply of these elements in our diet?

Before discussing the justification of the blood regeneration claims accorded iron and copper, it is important to point out that these elements are concerned only with hemoglobin formation. They have little to do with other blood constituents; even the red blood cells are only indirectly affected by these metals.<sup>1</sup> For example, in secondary or hypochromic anemia the body is unable to form sufficient hemoglobin, and the corpuscles decrease because they have no pigment to carry. When the amount of hemoglobin increases, the number of cells returns to normal providing there is no deficiency in the cell forming mechanism. In pernicious anemia the decrease in the cell count is the primary change, and the hemoglobin content decreases because there is an insufficient supply of cells to carry the hemoglobin. The mechanism of hemoglobin formation is not impaired in this form of anemia. We must keep in mind then that the supply of iron and copper affects only the hemoglobin content of

the blood and that the other changes observed are indirectly dependent upon the quantitative changes in the amount of pigment.

We must also remember that iron and copper are equally essential for hemoglobin formation although the quantitative requirement of each element may differ to a large extent. Since iron is a constituent of the molecule and copper acts only in a catalytic capacity, it is easy to see why more iron than copper is needed. I do not believe it is necessary at this time to discuss any of the divergent opinions which have been held concerning the specificity of copper. The necessity of copper as a supplement to iron has been demonstrated in so many different laboratories and with so many different animals that there can be no question about the requirement of copper for all red-blooded animals. It is also possible to refer to a number of clinical reports which demonstrate the necessity of copper for humans.

Copper cannot take the place of iron nor can it compensate for unavailable forms of iron. Copper functions only in the production of hemoglobin from the iron after it is assimilated.<sup>2</sup> Absorption and retention of iron and the conversion of iron into hemoglobin are two separate mechanisms. Studies on the availability of iron, therefore, should not be neglected because copper has been associated with hemoglobin synthesis. In order that active hemoglobin formation can take place the body must

\* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

contain definite quantities of both iron and copper. The actual amount which must be supplied in our diet each day to maintain a normal blood stream depends upon the rate of hemoglobin formation and the storage of the elements in the body. In rapidly growing infants there is a great demand due to the continual production of new blood. During the early suckling period this demand is satisfied almost entirely by the iron and copper present in the liver at birth, because the milk diet furnishes only small amounts of these elements. The supply in the liver is soon exhausted and unless additional sources of these elements are included in the diet anemia develops. Spectrographic analyses of livers from children, recently reported by Ramage, Sheldon and Sheldon,<sup>3</sup> show that the iron and copper content of the liver falls rapidly during the nursing period and increases when a mixed diet is taken.

During the past 5 years we have studied the hemoglobin content of the blood of approximately 1,000 children brought to the child health centers in Madison.<sup>4</sup> The results clearly demonstrate two facts: First, severe anemia is encountered in very few cases. It is only when all modern methods of infant feeding are completely disregarded and a diet of milk alone continued for 5 to 6 months that exceedingly low hemoglobin readings are obtained. Second, a slight anemia is found to be present in a large percentage of well fed children. At present I am unable to make any statement concerning the seriousness of these subnormal values. However, Miss Mackay<sup>5</sup> has reported similar results for children in London and has correlated the prevalence of children's diseases with a low hemoglobin content of the blood. Kato and Emery<sup>6</sup> also state that there must be some relation between the low hemoglobin content of the blood and the degree of resistance against invading

microorganisms. During the past year we have studied the effect of supplying additional iron and copper to the diets of a number of the children brought to the clinics. The work is still in progress, but the results to date indicate that the addition of these metals causes a definite increase in the hemoglobin in a very large percentage of the cases. In infants 5 months to 1 year of age the values increase from 10 to 11 gm. up to 12 to 12.5 gm. per 100 c.c. of blood. The latter figure appears to be the maximum value for infants of this age and readings above 12.5 gm. are seldom encountered even after feeding relatively large amounts of iron and copper. The maximum level increases with age, reaching values of 14 to 15 gm. when the individual is about 15 years of age. Thus, growing children are not only required to produce sufficient hemoglobin to supply the increasing blood volume but also to compensate for the increase in the normal hemoglobin content of the blood. I know of no comprehensive studies on the prevalence of anemia in children between the ages of 5 and 15 years, but from my meager experience with blood studies on college students I would not be surprised to find that many young adults have subnormal hemoglobin values.

Recent studies by Minot and Heath,<sup>7</sup> Dameshek,<sup>8</sup> and others have shown that hypochromic anemias are much more prevalent in adults than is generally supposed. In many of these cases the deficiency is due to an abnormality in the gastrointestinal tract preventing the proper utilization of iron. Even in cases of pernicious anemia treated with purified liver extract, the body's capacity for hemoglobin production may not be sufficient to allow a maximum rate of blood regeneration.

This short discussion of the demands for hemoglobin production clearly indicates that an anemia of low color index may be present, and is present to a

lesser or greater extent, in a large number of individuals. What is the best way to insure an adequate supply of iron and copper, which are known to be essential for hemoglobin production? If we are interested only in the simplest and cheapest method, there is no better way than to add simple iron and copper salts to our diet. We now have ample proof that inorganic salts can serve as the sole source of iron and copper.

In the laboratory<sup>9</sup> rats have been raised from birth to maturity on cow's milk supplemented with iron and copper salts, together with a small amount of manganese, which is also needed to make milk complete. Second and third generation rats have been produced on this diet. Farm animals such as pigs and calves have been reared successfully on mineralized milk. During the past summer I had two students who lived on mineralized milk for 6 weeks. They consumed between 3 and 4 quarts of milk daily together with the proper quantities of iron, copper, and manganese. The only other food which they ate was one orange a day. The boys remained in excellent health and an actual increase in the hemoglobin content of the blood was observed during the experimental period. This not only demonstrates the completeness of a diet of mineralized milk, but it also shows that humans can rely on inorganic forms of iron and copper for hemoglobin production. Thus the entire iron requirement of one individual can be supplied at the cost of a few pennies per year, and the copper requirement can be satisfied for about one-tenth of one cent. Can we ask for a simpler method of insuring hemoglobin production? This does not mean that the entire problem of hemoglobin formation has been solved. I have said nothing about the organic precursors of the blood pigment, but from a practical point of view it is sufficient

to state that milk supplies these requirements. There is also much to be learned about the best forms and amounts of salts to be supplied. This can only be determined by long clinical experience.

In spite of the availability of such cheap forms of iron and copper most of us are not going to obtain our supply in this form. The fact is human beings have obtained their supply from foods for thousands of years before we knew these elements existed, and humans who are unaware that they need such metals will continue to obtain iron and copper from ordinary foods. However, if we are to rely upon foods alone for the maintenance of a normal blood stream we must know the limitations of each type of food and the methods of eliminating these deficiencies. The deficiency of milk in blood forming elements is universally recognized today and means are generally taken to compensate for the deficiency. In choosing foods to supplement those low in iron and copper we have used the total iron and copper content as the basis of our choice. In the case of iron we now know that this is not justifiable. We used to think that all food iron was readily available and utilizable. This is far from true. Food materials contain varying amounts of hematin iron and this form of iron cannot be assimilated. One mg. of iron supplied by wheat is not nearly as valuable as one mg. of iron supplied by a simple salt. The unavailability of a good share of the iron in many of the foods used in infant dietaries probably explains the prevalence of subnormal hemoglobin values observed in the children we have studied. Experimental work which we have conducted with rats during the past year<sup>10</sup> clearly indicates that diets of milk and cereals or cereal products are decidedly deficient in blood forming elements. These diets are more deficient in iron than copper,

and a fair rate of hemoglobin regeneration was obtained by the addition of iron alone.

The maintenance of an optimum level of hemoglobin in rapidly growing infants is only possible if the demands on the liver iron and copper are reduced to a minimum by the early inclusion in the diet of foods rich in these elements. If an infant is born with a reduced supply, or if the supply is used up during the first few weeks of life, it is very difficult to reestablish a high level with food alone. The hemoglobin value can be increased to the optimum level in most children by supplying a small but definite amount of iron salts. I am of the opinion that a large number of children would benefit by the treatment. This does not mean that all children who do not receive this treatment would be severely anemic, but it would insure an optimum hemoglobin level which may be of great value in combating certain diseases.

The availability of the copper in different foods has not been studied. From a practical point of view this question may not be as important as the availability of iron because the requirement for copper is less and many foods which make up the bulk of our diet are relatively rich in copper. In many cases the hemoglobin building power may be restored to normal by the addition of iron alone, but until we are certain of an ample supply of available copper I feel it is wise to supply a small but definite amount of copper along with the iron.

So far I have discussed only the maintenance of a normal blood stream or the restoration of the blood when there is only a slight decrease in hemoglobin. When it becomes necessary to treat anemias with very low hemoglobin values, even foods considered to be rich in iron cannot supply enough to allow rapid regeneration. A number of workers have found iron salts to be superior

to liver for the treatment of these anemias. Iron salts are now used extensively for the treatment of hypochromic anemias. The question at present seems to be whether copper should be supplied. In these cases the demand for iron is so great that the requirement for copper may seem insignificant. It is also possible that the diet supplies the needed amount, but unless you can be certain of this fact the copper should be added. Dame-shak<sup>8</sup> Mills,<sup>11</sup> Josephs,<sup>12</sup> and others have reported a number of cases which did not show a maximum response to iron until copper was added. If hemoglobin formation is actually retarded in some cases by a deficiency of copper, then the supply in many others must be close to the border line. This does not mean that we should recommend a wholesale use of copper salts, but that we should use standardized iron and copper preparations whenever there is a danger of copper deficiency.

In conclusion, we may say that diversified diets supply sufficient iron and copper for the maintenance of a normal blood stream in adults with normal hemoglobin requirements. For rapidly growing children and for adults with increased hemoglobin demands, many diets may be low in iron and possibly copper. The value of foods for supplementing diets low in iron and copper must be based upon the amount of available elements, not upon the total content. Diets deficient in blood forming elements may be rendered complete by addition of standardized quantities of iron and copper salts.

#### REFERENCES

1. Schultze, M. O., and Elvehjem, C. A. The Relation of Iron and Copper to the Reticulocyte Response in Anemic Rats. *J. Biol. Chem.* 102:357 (Oct.), 1933.
2. Elvehjem, C. A., and Sherman, W. C. The Action of Copper in Iron Metabolism. *J. Biol. Chem.* 98:309 (Oct.), 1932.
3. Ramage, H., Sheldon, J. H., Sheldon, W. A. Spectrographic Investigation of the Metallic Content of the Liver in Childhood. *Proc. Roy. Soc. London B* 113, 308, 1933.

4. Elvehjem, C. A., Peterson, W. H., and Mendenhall, D. R. Hemoglobin Content of the Blood of Infants. *Am. J. Dis. Child* 46:105 (July), 1933.
5. Mackay, H. M. M. Nutritional Anemia in Infancy. *Spec. Rep. Series*, Medical Research Council, London, 157, 1931.
6. Kato, K., and Emery, O. J. Hemoglobin Content of the Blood in Infancy. *Folia Haematol.* 49:106 (Jan.), 1933.
7. Minot, G. R., and Heath, C. W. The Response of the Reticulocytes to Iron. *Am. J. Med. Sci.* 183:110 (Feb.), 1932.
8. Dameshek, W., Primary Hypochromic Anemia. *J.A.M.A.* 100:540 (Feb.), 1933.
9. Kemmerer, A. R., Elvehjem, C. A., Hart, E. B., and Fargo, J. M. The Nutritive Value and Efficiency of Mineralized Milk. *Am. J. Physiol.* 102:319 (Nov.), 1932.
10. Elvehjem, C. A., Hart, E. B., and Sherman, W. C. The Availability of Iron from Different Sources for Hemoglobin Formation. *J. Pediat.* In press.
11. Mills, E. S. The Treatment of Idiopathic (hypochromic) Anemia with Iron and Copper. *Canad. M. A. J.* 22:175 (Feb.), 1930.
12. Josephs, H. W. Treatment of Anemia in Infancy with Iron and Copper. *Bull. Johns Hopkins Hosp.* 49:246 (Oct.), 1931.

## Child Labor Law of May, 1933, Egypt

A CHILD labor law of May 3, 1933, establishes a minimum age of 12 years for employment in factories, workshops, mines, and quarries, and in construction and transportation work. It does not apply to agriculture nor to home work in which only the members of the family are employed. However, children between the ages of 9 and 12 years may be employed in spinning, weaving, and knitting establishments and in other work "compatible with their age and physical ability." This provision is similar to a provision in a law of 1909 and in an order of 1931.

The new law limits the working day for children from 9 to 12 years of age to a maximum of 7 hours, exclusive of rest periods amounting to 1 hour. However, the law provides for the first time that in the case of children attending elementary schools the total hours of work, added to class hours, must not

exceed 7. For children between 12 and 15 years a maximum day of 9 hours is prescribed, exclusive of rest periods amounting to 1 hour. Children below the age of 15 years may not be employed between 9 p.m. and 5 a.m.; they must also be given a weekly rest of at least 24 consecutive hours.

The new law prohibits the employment of children below the age of 17 years in certain specified occupations, and of children below the age of 15 years in certain other occupations without a certificate from the public health officer as to their physical ability to perform the work. No person below the age of 17 may be employed without an identification card giving his name and age and bearing his photograph. The law is to be enforced by inspectors. Penalties are prescribed for violations.—*Journal Officiel du Gouvernement Egyptien*, June 26, 1933.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

### EDITORIAL COMMITTEE

MAZYCK P. RAVENEL, M.D., *Editor in Chief*

AUGUSTA E. JAY, *Assistant Editor*

C. C. YOUNG, D.P.H.

ARTHUR P. MILLER, C.E.

CLARENCE L. SCAMMANN, M.D.

EMERY R. HAYHURST, M.D., Ph.D.

HENRY F. VAUGHAN, Dr.P.H.

### ASSOCIATE EDITORS

HENRY F. VAUGHAN, Dr.P.H., AND IRA V. HISCOCK,  
Public Health Administration

LOUIS I. DUBLIN, Ph.D., Vital Statistics

ARTHUR P. MILLER, C.E., Public Health Engineering

ARTHUR P. MILLER, C.E., Public Health Engineering

GREENBURG, M.D., Ph.D., Industrial Hygiene

JOHN F. NORTON, Ph.D., Laboratory

WALTER S. FRISBIE, Food and Nutrition

RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

---

## THE DEPRESSION AND HEALTH APPROPRIATIONS

TO ascertain the extent to which the present economic depression has affected the appropriations available to public health departments in the United States, questionnaires were recently sent out to the health officers of the 48 states and of the 108 largest cities in the country.<sup>1</sup> Replies were received from 36 states, aggregating a population of over 89,000,000 or approximately 71 per cent of the total population of Continental United States, and from 62 cities whose populations totaled 24,241,000, or about 61 per cent of the total population of the 108 cities questioned. It is believed that the results of the analysis of the data supplied by these health departments are fairly representative of conditions throughout the United States today.

In keeping with the general tendency to curtail expenditures in all governmental departments, there has occurred a sharp reduction of public health budgets. These reductions do not seem to have exceeded those connected with other governmental functions. Nevertheless, in view of the fact that appropriations for health conservation in most states and cities never have been adequate even in the best of times, it is felt that the continuation of the present tendency might jeopardize much of the progress made during the past two decades.

Of the 36 states which supplied the required data, 29 showed reductions in 1933 over 1931, ranging from 77 per cent in North Dakota to less than 3 per cent in Montana. Fifty-six cities reported similar reductions ranging from 47 per cent in Canton, Ohio, to 2 per cent in Richmond, Va. Seven states and 5 cities reported increases in public health budgets during this period, but for the most part, these were slight. One city, Nashville, Tenn., showed no change since 1931. The average reduction in the 29 states and 56 cities which reported reduced health budgets was about 17 per cent, slightly less in the states and a little more in the cities.

These figures represent net reductions between the appropriations of 1933 and the expenditures of 1931. In some cases, a small increase in one year was offset by a greater decrease in another year. However, there were 13 states and 44 cities which showed reductions in both years. Among these states, the total reduction since 1931 averaged 26.5 per cent; among the cities, 18 per cent.

Significant as are these figures, they nevertheless fail to portray the true gravity of the situation. Appropriations in 1933 cannot properly be compared with expenditures in 1931, for the reason that in many of the states and cities, 1933 revenues are almost certain to fall short of those anticipated; in which case, appropriations for health work will have to be scaled still further to enable these communities to maintain balanced budgets.

General figures, such as have been cited, however, cannot show how serious conditions are in certain sections of the country. For example, North Dakota in 1933 reduced its appropriation for health work from \$38,819 expended in 1931, to \$9,032 in 1933, a reduction of nearly 77 per cent; Mississippi showed a decrease from \$526,394 in 1931 to \$130,000 in 1933, about 75 per cent; Alabama, reduced from \$677,110 to \$436,954, or nearly 36 per cent; Virginia, from \$606,700 to \$404,215, or exactly one-third; and Ohio's health budget declined from \$323,273 to \$229,820, or 29 per cent.

Among the cities, the largest reduction occurred in Canton, Ohio, where the 1931 budget of \$40,527 was reduced to \$21,690 in 1933, or nearly 47 per cent; in Seattle, Wash., the health appropriation fell from \$667,202 to \$410,653, 39 per cent; in Birmingham, Ala., it decreased from \$98,591 to \$61,370, 38 per cent; and in each of the cities of Peoria, Ill., Flint, Mich., and New Haven, Conn., the reductions amounted to over 36 per cent.

In certain of these communities, the reductions represent principally cuts in salaries which have been absorbed by the staffs but in many cases they have also necessitated curtailment of essential activities and the scaling of personnel to mere skeleton organizations.

Hundreds of physicians, nurses, inspectors, clerks, and others specially trained in the technic and routines of public health work have been dropped. We have been most fortunate in that we have not had to contend with any serious epidemics during the past 3 years. If such an epidemic should occur as swept the country in 1918, it is not difficult to imagine the serious consequences which might follow with health departments in their present depleted conditions.

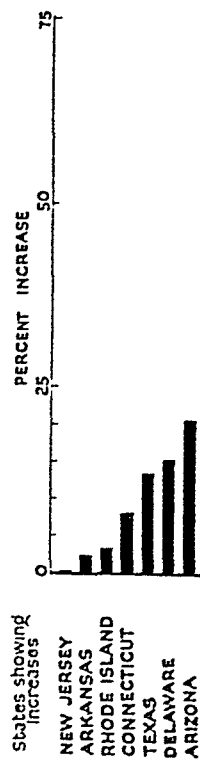
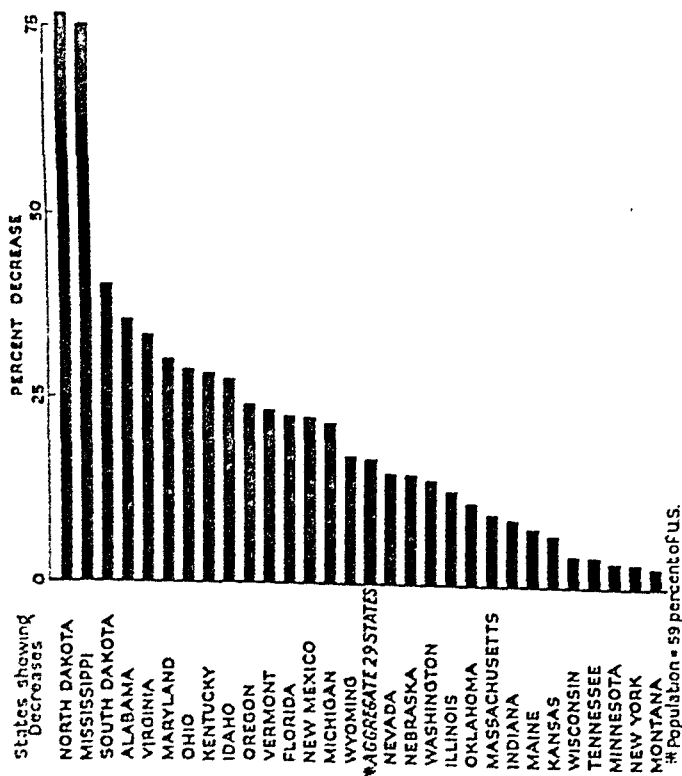
The worst feature of the situation is that many of the largest reductions have occurred in those communities which apparently have been the least able to stand them, considering the low per capita expenditures for health work in these places during past years. The cities and states which had good organizations have apparently learned the value of their investment in health work and have made only moderate reductions in their appropriations.

A further matter for concern is the fact that most of the private agencies interested in public health work, such as hospitals, clinics, public health nursing associations, etc., have suffered even larger cuts in their budgets than have been enumerated above respecting public agencies.

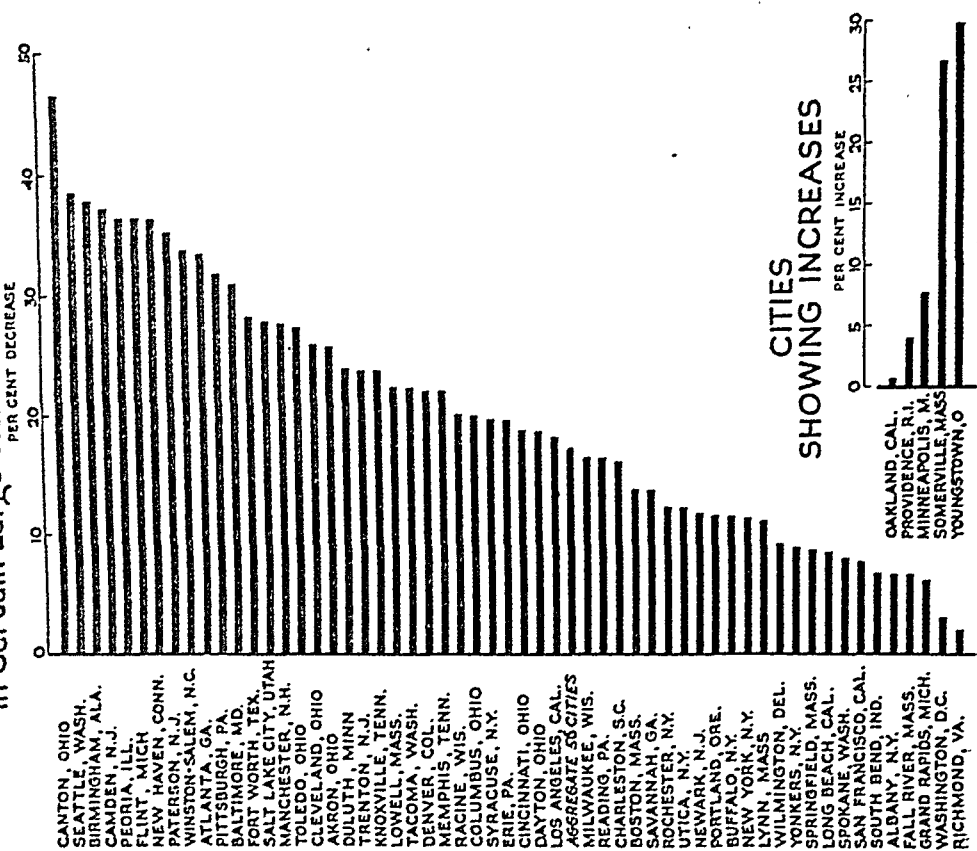
In view of all this, it is astonishing that the general health of the country has been maintained in such excellent state during the past 4 years. It is, perhaps, for this very reason that there has been such general inclination to reduce health expenditures during this period. We must not allow ourselves to be lulled by such seeming security. Undoubtedly, the present favorable state of public health is



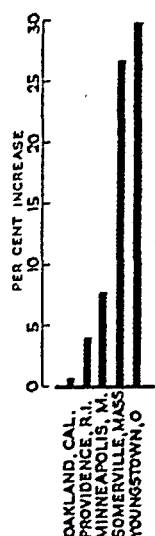
# REDUCTION IN HEALTH DEPARTMENT BUDGETS In Certain States 1931 to 1933



# REDUCTION IN HEALTH DEPARTMENT BUDGETS In Certain Large Cities 1931 to 1933



## CITIES SHOWING INCREASES

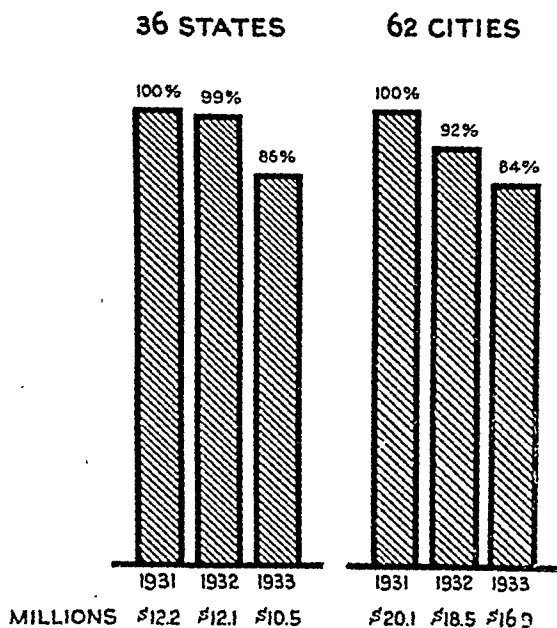


very largely due to the momentum obtained in the past. Any appreciable let-up in our efforts would probably result in serious consequences.

In view of the present situation, it is recommended that the Association use all of the channels of publicity open to it to obtain the ear of the American people, and especially of those in authority, in order to stem the tide of further curtailment of health budgets. The Association must emphasize the fact that at the present time per capita health expenditures are in the aggregate running pretty close to \$.70 per annum; that such amounts are insufficient for adequate service, that at the first moment when economic conditions permit, the per capita health expenditure should be raised at least to the level of \$1 which prevailed in 1930; and that, thereafter, the communities should be encouraged to raise their budgetary allowances so that ultimately the standard declared by the Association to be essential, namely, \$2 per capita, may be realized. It is further recommended that in the interval the Federal Government be urged to take note of the situation of the local and state health services and make available through relief or other special appropriations such amounts as will help maintain health departments in good working order.

Finally, it is recommended that the Association coöperate in every way possible with other national organizations interested in public welfare, and further the campaign to maintain the health work of private agencies at their previous levels. At the present time, the reduction of appropriations for public health work has thrown enormous burdens on such private organizations as visiting nurse organizations, child health stations, tuberculosis clinics, etc. These organizations merit public support more than ever before. The community chests and other agencies engaged in the collection of funds for the support of these associations should receive the backing of health officers and other members of the American Public Health Association.

## EXPENDITURES FOR HEALTH 1931, 1932 & 1933



1. Report of the Committee on Stabilization of Health Appropriations (Louis I. Dublin, Ph.D., *Chairman*) of the American Public Health Association presented to the Governing Council at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

## DOCTOR PARK NOT TO RETIRE

THE report current in New York City last month that Dr. Park would be retired from his position in the city health department on reaching the age limit, 70, in December attracted attention throughout the country. The leading newspapers in New York discussed the matter in their editorial columns and urged that steps be taken to secure Dr. Park's retention. Letters to the editor were

published praising Dr. Park's services and protesting against his retirement. A petition was circulated asking the Board of Estimate, in whose hands the matter lies, to continue Dr. Park in service.

An inquiry directed to the Department of Health discloses the fact that the law requires the retirement of all civil service employees when they have reached the age of 70. In order, however, not to lose employees whose services are still valuable to the city, the Board of Estimate is empowered to continue such persons in service after formal application for such continuance has been made. Dr. Park has not yet filed his application, though it is understood he is willing to continue in service and will comply with this necessary formality. On the part of the Department of Health there is no willingness to let so valuable a scientist as Dr. Park leave the service and when Dr. Park's application is forwarded it will, we are told, carry the strongest possible endorsement from Health Commissioner Wynne.

Inasmuch as all such applications must be acted on by the Board of Estimate, made up of the Mayor, the Comptroller, the President of the Board of Aldermen and the five Borough Presidents, no one is in a position to announce in advance what action will be taken. In the case of Dr. Park's application there is no reason to doubt that the Board will be heartily in favor of retaining Dr. Park in service. Because of the wide interest aroused by the matter, Mayor O'Brien has written to Dr. Park expressing the hope that Dr. Park will continue to give the city the benefit of his services. The Mayor has also assured him of hearty support when the formal application comes before the Board of Estimate.

It is gratifying to learn that the rumors of Dr. Park's retirement are baseless and that public health workers throughout the world are to continue reaping the benefits of the splendid work done under Park's direction in the laboratories of the New York City Department of Health. With so many important health problems demanding solution by laboratory methods, we can ill afford losing a man of Park's outstanding ability. We hope he will continue to aid us for many years to come.

## AMEBIC DYSENTERY IN CHICAGO

AT the recent meeting of our Association in Indianapolis, a paper was read, which on account of its importance has been published elsewhere,<sup>1</sup> since it seemed advisable to get this before the public more promptly than was possible in a monthly journal. There is also a special article<sup>2</sup> and an editorial<sup>3</sup> on the same subject.

Briefly, the facts are that during the summer an outbreak of amebic dysentery occurred in Chicago, and up to date, there have been 185 cases, with 19 deaths and 193 carriers of *Endameba histolytica*. The infection was traced to one of the prominent hotels which employed some 364 food handlers, among whom there were found 15 active cases and 11 carriers. A disquieting feature is that two food handlers who were discovered in the 1927 outbreak<sup>4</sup> were also among those involved in the present flare-up. In 1929, 148 food handlers were examined, among whom 27 carriers and 2 acute cases were found.<sup>5</sup> Some groups were especially hard hit. Of a committee which met in Chicago in June, 6 members developed colitis and 4 of them died. Three of these deaths have been proved to have been due to amebic dysentery. It is also stated that Texas Guinan, who died in the

West on a theatrical tour, was also a victim of this disease. The figures given prove conclusively that amebiasis was widely spread among the food handlers of this particular hotel. An attempt is being made to find out, through a questionnaire to 22,000 guests of the hotel chiefly concerned, approximately how many visitors to the Chicago Fair have been infected. Of 3,490 replies returned, 180 reported illnesses, of which 69 were diagnosed as amebic dysentery and 23 suspected of having the disease.

The lesson from this outbreak is clear; namely, the compulsory examination of all food handlers before employment and careful supervision of them afterwards. This is a difficult task, as food handlers are rather a migratory type, and especially at times when a city is crowded with visitors, as Chicago was during the World's Fair, large numbers of outside workers are apt to come in who later return to their homes. It is advised that those who have a history of amebiasis should be examined repeatedly for at least 4 months, and thereafter every 6 months for the rest of their lives.

Physicians and health officers throughout the country should be on their guard. The diagnosis of amebic dysentery can be made certainly only by a well equipped laboratory such as will be found in all of our cities and states. There is no doubt that amebiasis has been too prevalent throughout the United States, but with such a source of infection as has existed in Chicago with its millions of visitors during the past summer, fresh infections and further spread of the condition is inevitable, so that double precautions as to early diagnosis and increased vigilance for cases and carriers should be maintained in every state and city.

#### REFERENCES

1. Bundesen, Rawlings and Fishbein, The Health Hazard of Amebic Dysentery, *J.A.M.A.*, Nov. 18, 1933, p. 1636.
2. Tonney, Hoeft and Spector, The Threat of Amebiasis in the Food Handler, *J.A.M.A.*, Nov. 18, 1933, p. 1638.
3. The Amebic Dysentery Epidemic, *J.A.M.A.*, Nov. 18, 1933, p. 1642.
4. Kaplan, Williamson and Geiger, Amebic Dysentery in Chicago, *J.A.M.A.*, Mar. 26, 1927, p. 977.
5. Williamson, Kaplan and Geiger, A Survey of Amebic Dysentery in Chicago, *J.A.M.A.*, Feb. 16, 1929, p. 528.

#### SENATE BILL NO. 1944

**A** BILL to prevent the manufacture, shipment and sale of adulterated or misbranded food, drugs, and cosmetics, and to regulate traffic therein; to prevent false advertisement of food, drugs, and cosmetics; and for other purposes.

Of this bill Dr. P. B. Dunbar of the U. S. Food and Drug Administration says:

President Roosevelt has ordered a complete revision of Doctor Wiley's famous "pure food law." The proposed new law, which retains all the worthy features of the Wiley act, modernized to meet present-day conditions, has already been introduced into Congress by Senator Royal S. Copeland of New York. It is identified as Senate Bill 1944 and will presumably come up for action early in the next session.

Dr. Wiley's pure food law provided protection to the consumer against food adulteration and misbranding. It covered conditions as they existed in 1906, and in spite of violent opposition at the time of its enactment has come to be accepted and appreciated today by the honest members of the very industries which it regulated. Times have changed and with the years the unscrupulous have

found ways of transferring matter from label to other means of consumer appeal. Cosmetics have come into a use totally unsuspected in 1906, and the present food and drug law has no control whatever over these products unless the manufacturer makes sufficient medical claims to permit their classification as drugs. As a result of all these changes there is today need for amending and enlarging the scope of the old law if consumer protection is to be maintained. There is need for more definite penalties and provision for methods of presenting evidence against the fraudulent if the enforcement officials are to be supported in their enforcement of public protection.

In brief, then, there is general recognition of need for change in the food and drug act and sympathy with the objectives of the present movement.

The question of support or opposition to Senate Bill 1944 is, however, more than a matter of sympathy with or opposition to the objectives of the protectors of consumer health. The bill states not only the objectives but the methods for attaining them. One may sympathize with objective and oppose the published method, and such opposition has been steadily developing since the industry and the public have had opportunity to study the wording of Bill 1944.

We do not regard this bill as an emergency measure in the sense of the measures that have been enacted to make business recovery and maintenance of homes and earning possible. It need not be "rushed" through Congress. Furthermore, the country's experience with the 18th amendment should be such as to counsel caution that a measure designed for the public welfare be one that will enlist the mental and moral support of the citizens concerned after enactment.

We appreciate that the only way to bring about a reform is to set up a plan of action. This has been done in the wording of Bill 1944. Given such a basis for further action, let every one in the American Public Health Association see to it that his representative in Congress knows his desire for the reforms suggested; but also let him know that we hold him responsible for a proper method of enforcement and for modification of the present wording wherever necessary to prevent its jeopardizing the very objectives sought.

In brief, we are for a revision of the present Food and Drugs Act to allow it to embrace control of cosmetics and of all media for presenting information about foods, drugs, and cosmetics to the public. We believe in giving our enforcement officials better tools for functioning. But we wish a law that will accomplish these ends, one that will be the true expression of what the consumer wants and needs. We solicit support for a bill but we ask that the bill be carefully framed even though to do so would necessitate extended conference and radical change in the phrasing of Bill 1944.

### PASADENA IN 1934

THE Governing Council of the American Public Health Association has elected to hold the 1934 annual meeting in Pasadena, Calif.

At first blush, this seems a rash procedure, traveling appropriations being what they are for public health workers. The immediate reaction of many eastern members will be to settle back now and decide to miss attendance in 1934 in the hope that 1935 will bring the organization again within an overnight ride from their homes.

The philosophy back of the decision to go to the west coast next year may be briefly stated. The Association is a national society. It is just as far from the Pacific Ocean to the Atlantic as it is from the Atlantic to the Pacific. The far western members have not been taken into consideration by the national body since 1918; yet every year thereafter the registration records have shown representation from western states. It is fitting and proper now for eastern public health workers to reciprocate this support and travel to Pasadena in the fall of 1934 to join with the Western Branch in the celebration of its fifth anniversary.

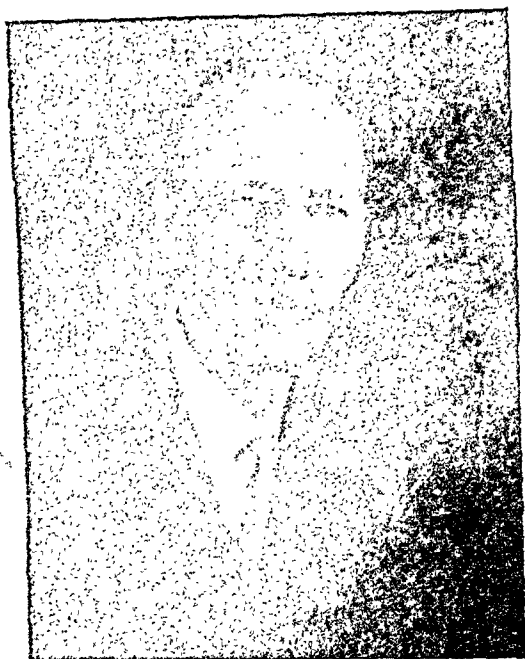
The Committee on Meetings and Publications reminds the Association members that attendance at the Annual Meeting of their Association should not be dependent upon the ability of their organizations to finance their travel. Many of the most important figures in the public health world who have attended meetings consecutively for many years have never received a penny from any source toward their expenses. They have dug into their own pockets without question for the privilege and pleasure of attending the one national meeting that is strictly the possession of the public health profession.

It is the obligation of the Association this year to bring to Pasadena for the benefit of its western members the same excellent scientific program that has been arranged in recent years, with a cast of headliners, and the same distinguished audience. To this end every member of the Association who has attended Annual Meetings in the past can contribute, and the Association expects the support of its membership.

The Pasadena meeting is 10 months away. Travel to the west coast next fall will be less expensive than ever before. The most advantageous arrangements will be made by the Committee on Meetings and Publications. If special party fares will bring the cost per person down, special trains will be set up at convenient points. To members who know now that their departments and institutions cannot afford to send them to Pasadena the suggestion is made that they employ a method similar to the Christmas Clubs and Vacation Clubs so universally used by banks everywhere for the accumulation of small weekly sums, to provide a travel fund that will assure their presence at Pasadena for what should be and can be the most colorful, enjoyable, and profitable gathering of public health workers ever held.

## ASSOCIATION NEWS

HAVEN EMERSON, M.D., PRESIDENT  
EUGENE LINDSAY BISHOP, M.D., PRESIDENT-ELECT



*Haven Emerson, M.D.  
President, A.P.H.A.*



*Eugene Lindsay Bishop, M.D.  
President-Elect, A.P.H.A.*

FOR the past year the office of President of the American Public Health Association has been filled by John A. Ferrell, M.D., Director of the International Health Board of the Rockefeller Foundation. At the Indianapolis Annual Meeting, Haven Emerson, M.D., President-Elect, became President. Dr. Emerson has been a member of the Association since 1914, was a Charter Fellow, and is also a Life Member.

DR. BISHOP, President-elect, is a native of Davidson County, Tenn. He is a graduate of Vanderbilt University School of Medicine, 1914, and received his C.P.H. from Johns Hopkins School of Hygiene and Public Health in 1923.

He was field director of Tennessee State Health Department 1916-1918; director, division of rural sanitation 1918-1922; Assistant Commissioner of Health 1923-1924; and since 1924 Commissioner and Assistant Professor of Preventive Medicine at Vanderbilt University School of Medicine.

He is a Fellow of the American Public Health Association; member of Committee on Administrative Practice, and Chairman of Sub-Committee on Rural Health Work; served for past 2 years as Chairman of Executive Board and a member of the Governing Council; was Secretary, and later Chairman, of the Health Officers Section. He was instrumental in the organization of the Southern Branch of the Association and

was elected President at its initial meeting in 1932.

Dr. Bishop was formerly a member of the Board of Scientific Directors of the Rockefeller Foundation, and is at present Chairman of the Committee on Federal Relations of the State and Provincial Health Officers and Committee on Standards of Qualifications for Local Health Officers of State and Territorial Health Officers.

He is a member of the Tennessee State Medical Association; Nashville

Academy of Medicine; American Medical Association (formerly Secretary, and later Chairman, Section on Preventive and Industrial Medicine of this Association); Southern Medical Association; National Malaria Committee (Chairman 1932); American Society for the Advancement of Science; American Social Hygiene Association; American Child Health Association. Member Alpha Omega Alpha, Alpha Kappa Kappa, and Delta Omega honorary fraternities.

## SECTION RESOLUTIONS

### ADOPTED AT THE INDIANAPOLIS ANNUAL MEETING

#### *Vital Statistics*

##### DEATH OF EDWIN W. KOPF

RESOLVED, that in the passing of Edwin W. Kopf, Charter Fellow of the American Public Health Association, the Section on Vital Statistics recognizes the loss of an honored member and acknowledged leader, who contributed invaluable services to the statistical study of mortality and morbidity. Mr. Kopf's ability and energy, together with his intellectual honesty and keen critical faculty in interpreting statistical data were qualities which not only inspired the admiration and confidence of his co-workers in the American Public Health Association, but which earned recognition abroad; and be it further

RESOLVED, that the Secretary be instructed to extend to his widow, Anna Belle Kopf, this expression of the high regard in which the members of the Vital Statistics Section of the American Public Health Association held Mr. Kopf's lovable character and fine scholarship; and be it further

RESOLVED, that in behalf of the Section, the Secretary be instructed to extend to Mrs. Kopf its deepest sympathy in her irreparable loss.

##### COMPLETION OF REGISTRATION AREA

The Section on Vital Statistics of the American Public Health Association recognizes with gratification that the Registration Areas for births and deaths have now become co-extensive with the continental area of the United States. This achievement is the culmination of 50 years of effort initiated by Dr. John Shaw Billings; ably continued by Drs. William A. King, Cressey L. Wilbur, and William H. Davis; and brought to a successful culmination by the present incumbent, Dr. Timothy H. Murphy, therefore be it

RESOLVED that the Section on Vital Statistics offer its congratulations to the Bureau of the Census, that Vital Statistics, the foundation of sound public health activity, have finally been placed upon a nation-wide basis, and be it further resolved that the Section expresses its appreciation to the agencies and individuals who have made this achievement possible.

##### COÖPERATION INVITED FROM UTAH

WHEREAS, the Registration Areas of the United States for births and deaths have now been completed, making



possible for the first time the publication of vital statistics on a nation-wide basis, and

WHEREAS, the complete realization of this objective is now made impossible only by the absence of returns from the State of Utah from January 1, 1932, to date, be it

RESOLVED, that the Section on Vital Statistics of the American Public Health Association appeal to the Honorable Henry H. Blood, Governor of the State of Utah, for coöperation with the other 47 states of the Union, in the prompt transmission of certificates of births and deaths to the Bureau of the Census.

#### PUNCH CARDS VERSUS TRANSCRIPTS

WHEREAS, definite decision has been made by the Bureau of the Census to accept punch cards from the New York State Health Department in lieu of transcripts of death certificates, and

WHEREAS, this action is, in effect, acceptance by the Bureau of the Census, for inclusion in its annual mortality reports, of the classification of certified causes of death by the New York State Health Department instead of by the Bureau of the Census, and

WHEREAS, the New York State Health Department (Division of Vital Statistics) is, for the present, in the unique position of having in charge of this important branch of its work the very man who, over a long period of years, had the same responsibility in the Bureau of the Census, and

#### LABORATORY LETTERS OF INTEREST

THE Laboratory Section archives were enriched during the Indianapolis meetings when Professor E. O. Jordan, one of the organizers of the Section although now—because of

WHEREAS, the New York State Health Department thus enjoys an advantage which should enable it so to classify the causes of death that the resulting death rates for the individual causes of death should closely approximate those which would result if the classifying were done in the Bureau of the Census. Now, therefore, be it

RESOLVED, that in view of the unique position of the New York State Department of Health, as hereinbefore noted, *and for that reason alone*, it is the sense of the Vital Statistics Section of the American Public Health Association that acceptance of that state's coding of the causes of death will not materially affect the comparability of New York State death rates with those published in Census Mortality volumes in the past, and be it further

RESOLVED, that it is also the sense of this Section that state health departments, in general, do not have the trained personnels requisite for this work; and that years of training would be required to bring them up to the standard of efficiency which obtains in the Bureau of the Census, and be it further

RESOLVED, that it also is the sense of this Section that the extension to other states of the practice of accepting punch cards would constitute a dangerous threat to the integrity of statistics of the individual causes of death, unless it be found practicable to have the editing staffs of the states work under the direct and continuous supervision of trained Bureau of the Census coders for a period of years.

changing interests—a member of the Epidemiology Section, furnished the Section with three letters written to him in 1899 by Dr. Wyatt Johnston of Montreal, Que., pertaining to the formation of what was then called the

Laboratory Committee of the American Public Health Association but which became the Laboratory Section. By vote of the Section Council these letters were read before the well attended luncheon session of the Section on Wednesday, and greatly interested all present. A motion was made by Dr. Lillian South of Louisville, Ky., and seconded by Dr. G. F. Reddish of St. Louis, Mo., that the originals of these letters be preserved among the section records and that a letter of thanks be sent to Dr. Jordan for his courtesy and thoughtfulness in furnishing these documents to the Section.

One letter is typewritten and signed by Dr. Johnston, requesting Dr. Jordan to become a member of the "Laboratory Committee." It mentions that Professor Welch of Johns Hopkins has consented to act as honorary chairman, and urges that Dr. Jordan's studies on the effects of the drainage canal be a motive for a preliminary communication at the meeting in Minneapolis in November, 1899. Dr. Johnston interestingly promises if the presentation is

made to "see as far as possible that any men from St. Louis who wish to take part leave their revolvers outside and employ as far as possible parliamentary language." The second is a circular letter, but signed by Dr. Johnston, requesting applications for membership and titles of papers for the first meeting. The third is a letter in Dr. Johnston's handwriting thanking Dr. Jordan for his contribution in advance of the meeting.

Several of those who heard the letters read expressed interest that the object of the formation of the Laboratory Committee, as expressed then by Dr. Johnston was "to unite the sanitary laboratory men in the Continent in some manner which will secure us the means of discussions coöperative of research, etc., besides a communication of our individual results."

The hope was expressed that others who have interesting old documents in their possession will be prompted by Dr. Jordan's action to submit them to the secretaries of any sections concerned.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.*

### *Health Officers Section*

Antonio Luis de Barros Barreto, M.D., D.P.H.,  
Caixa Postal 251, Bahia, Brazil, S. A., Health  
Officer, Federal Department of Public Health  
(Associate)  
Wedford W. Brown, M.D., City Hall, Athens,  
Ga., Commissioner of Health, Athens and  
Clark Counties  
Fratris L. Duff, B.S., Department of Public  
Health, Lawton, Okla., Health Officer  
Daniel V. O'Leary, M.D., 315 Delaware Ave.,  
Albany, N. Y., Health Officer

### *Laboratory Section*

Lewellyn S. Dibble, B.S., 78 Nilan St., Hart-  
ford, Conn., Director of Laboratory, Bryant  
and Chapman Company

Renwick H. Leitch, M.A., Dairy Research  
Labs., Auchincruive Ayr, Scotland, Professor  
of Dairying, West of Scotland Agr. College  
(Associate)

Victoria Orner, B.S., 111 N. Monroe St.,  
Sturgis, Mich. (Associate)

William A. Starin, Ph.D., Dept. of Bac-  
teriology, Ohio State University, Columbus,  
O., Professor of Bacteriology

William M. Stockwell, M.D., Cedarcrest Sana-  
torium, Hartford, Conn., Supt. and Medical  
Director

### *Public Health Engineering Section*

H. B. Foote, State Board of Health, Helena,  
Mont., Engineer

James P. Myers, B.E., 29 Frank St., Preston,

Victoria, Aust., Swimming Pool Manager (Associate)  
 A. D. Sloane, 64 Main St., Perry, N. Y., Sales Manager, Kaustine Co., Inc. (Associate)

*Food and Nutrition Section*

Henry T. Scott, Ph.D., Univ. of Wisconsin Alumni Research Foundation, Director of Biological Research

*Child Hygiene Section*

Ina Gerritt, B.S., 114 E. Glenwood, Fullerton, Calif., Teacher of Hygiene, Fullerton High School

*Public Health Education Section*

Nellie G. Loftus, R.N., 25 N. Loveland Ave., Wilkes-Barre, Pa., Supervisor G-U Clinic

No. 1, State Department of Health  
 I. Franklin Miller, P.O. Box 133, Pittsburgh, Pa. (Associate)  
 Willa Murray, B.A., 1343 H St., N. W., Washington, D. C., Assistant to Director, National Committee on Federal Legislation for Birth Control

*Public Health Nursing Section*

Beatrice I. Hamel, R.N., 335 Huntington Ave., Suite 32, Boston, Mass., City Public Health Nurse.  
 Esther M. Latimer, R.N., 26½ E. Main, Danville, Ill., Supervisor, Child Welfare Assn.  
 Charlotte E. McGee, R.N., P.H.N., 1625 Appleton St., Long Beach, Calif., Public Health Nurse, Tuberculosis Assn.

## LETTER TO THE EDITOR

### TO THE EDITOR:

In the October, 1933, issue of the *American Journal of Public Health* appeared a letter to the Editor from G. M. Mackenzie, M.D. suggesting that the laboratory "standards" used in *Community Health Organization* are too low, and also that "contacts and the correlation of the clinical aspects of public health work and laboratory diagnosis can be achieved far more successfully if the director of the laboratory is a graduate in medicine." Before publication, Dr. Mackenzie courteously sent me a copy of this letter, but circumstances prevented a reply until now. Such communications are welcomed because of the value of exchange of viewpoints in the line of progress.

Although the "Estimates" or so-called "Standards" given are not those of the editor, but of the Sub-Committee on Appraisal of Municipal Health Work of the Committee on Administrative Practice of the American Public Health Association, the following comments are offered. It has been a guiding principle of the Appraisal Committee to set standards not beyond the attainment of all cities but at a point which is actually

reached by a quarter of the cities. They are not "ideal" or "maximum," and perhaps for some cities not even "adequate" standards. They are, however, practical working standards proved by experience to be well within the range of attainment. The standards used in *Community Health Organization* were based on the 1929 edition of the *City Appraisal Form*, and these standards were in turn based on the actual experience in cities immediately prior to this.

The laboratory section of the *Appraisal Form*, during the 1929 revision, was submitted to a committee appointed by the Chairman of the Laboratory Section of the A.P.H.A. and the members gave much consideration to the items, and recommended revisions which were incorporated. The "specimen" was adopted as the unit in place of the somewhat indefinite term (with varying interpretations) "examination." Specimen was defined as "similar material submitted to a laboratory in a single container from a single source. A note attached to the item "6,000 examinations per 100,000 population" read: "The grand total of specimens and ad-

ditional reported results. Credit will be granted only for work actually done in *local laboratory maintained by the community.*"

Laboratory service has increased since 1929 and the new edition of the *Appraisal Form* (1934) will undoubtedly recognize this fact. From such data as are available, it would appear that the services now rendered in New York State, as shown in Dr. Mackenzie's table, are greater than throughout the country generally. Thus it is probable that even with the raising of standards in accordance with increased service generally, the actual standards set in the new *Appraisal Form*, in accordance with the principle of adjusting them to the point which is exceeded by the upper quartile of cities, will still not be as high as some of the figures given by Dr. Mackenzie.

Relative to the need for a graduate in medicine as a laboratory director, conditions vary. The degree is far less important than the ability, personality, and training of the individual in charge. Considering practical problems throughout the country, it is my belief that cases are rare where a medical director of a public health laboratory is needed in a city of 200,000 population or less. The medical degree may be an asset but rarely an essential if the laboratory director has sufficient medical contacts to comprehend the significance of his work. There are many cities and counties, and even some states, where the public health laboratory is efficiently directed by a non-medical person and where the physicians regard highly the laboratory service.

Very truly yours,  
IRA V. HISCOCK

## Members and Fellows of the A.P.H.A.

### WHY PAY ANNUAL DUES?

IF you dislike the bother of paying membership or Fellowship dues each year, or

IF you are one of those absent-minded people who have to be reminded again and again of unpaid dues, or

IF you are thrifty, *then you should apply for*

### LIFE MEMBERSHIP in the A.P.H.A.

Write to the Committee on Fellowship and Membership of the American Public Health Association for information regarding this form of membership.

# PUBLIC HEALTH ADMINISTRATION

**Milbank Memorial Fund** — The twenty-eighth year of the Fund's activities was characterized by somewhat increased emphasis on the larger aspects of public health and social welfare.

The Fund's previous experience in health demonstrations and in conducting or aiding in various experimental public health and related projects has strengthened its belief that public health, as a social function, is concerned not only with direct measures for the prevention of disease and the education of the public in hygiene, but also with the medical care of the sick, the proper administration of relief, and with the prevention of all conditions that are harmful to health, whether they be economic, social, or more directly etiological. In this course, the Fund has been aided by the wise advice of its various boards of counsel and by the coöperation of a number of voluntary and official agencies, local, state, national, and international.

In connection with the Bellevue-Yorkville demonstration in New York, many of the services developed within the area have been extended to other parts of the metropolitan district; the policy of district health administration through health centers has been adopted, and a program of district or decentralized health administration has been decided upon. The Fund has conducted studies aimed at finding out how existing public health procedures can be made more effective through increased efficiency of personnel and by more careful selection of individuals.

Coöperation is being given the U. S. Public Health Service in a consideration of the health problems of adult life; in a scrutiny of public health procedures, especially in nursing, maternal, infant, and child hygiene, tuberculosis and communicable disease control, and in the treatment of syphilis. Support is also extended to the International Health Organizations of the League of

Nations in a study of the effect of the depression on health. Among the research studies in which coöperation is being given are the extent to which birth control is practised in families of different economic and social class and the effectiveness of different methods; the coöperation on syphilis research with the medical schools of The Johns Hopkins University, Western Reserve University, University of Pennsylvania, University of Michigan, and the Mayo Clinic; in the maintenance of a school of nursing in the Syracuse University Medical School; in research on rheumatic fever in the Yale University School of Medicine.

The Fund is financing and technically assisting a unique and noteworthy public health experiment in a typical rural area of China, which is being conducted under nonpolitical auspices, and is coördinated with the agricultural, industrial, and educational program of the Chinese National Association for the Mass Education Movement. Technical assistance was given to the President's Research Committee on Social Trends in the preparation of that committee's notable report, and financial aid was given to various health, social welfare, and educational projects of such organizations as the New York Academy of Medicine, the Association for Improving the Condition of the Poor, the Henry Street Settlement, the East Harlem Nursing and Health Service, and the Judson Health Center.

**Kanawha County, W. Va.**—The seventh annual report of the county health unit for the year ending June 30, 1933, emphasizes the value of artificial immunization against diphtheria, small-pox, and typhoid. Most of the phy-

sicians in the county, especially those on contract with coal companies, do most of the immunizing in their communities. Many of the coal companies accepted the recommendation of the health unit to require that anyone moving into their houses submit to artificial immunization of all members of their families unless previously protected. During the year there were given 8,366 immunizing treatments against typhoid, 5,677 against diphtheria, and 4,059 against smallpox. There was no smallpox during this period. The county employs a physician to attend to the medical care of prisoners, inmates of the county infirmary, and indigent cases.

Public health education is stressed, and the health unit is supported in this program by the school authorities, the Women's Clubs, the 4-H clubs, insurance companies, and milk companies, as well as by the medical profession. The disaster committee of the American Red Cross gave special assistance in flood relief work.

Syracuse, N. Y.—The year 1932 marked the 100th anniversary of the formation of the board of health for the community which later became known as Syracuse. In the U. S. Chamber of Commerce Health Contest, Syracuse shared honors for first place in 1932 with New Haven in the population class. At the medical dispensary, over one-fourth of the 81,000 visits were made by persons applying for medical aid for the first time, and since 1929 the number of dispensary cases has increased 40 per cent. In addition, the 6 physicians employed by the Department of Health to make home calls upon the indigent sick, during the year, made 12,000 such visits, or over twice the number made in 1931, and nearly four times the number made in 1930. Outbreaks of measles and whooping cough required 21,963 home calls by nurses in contrast with 8,281 in 1931. In pre-

natal clinics, over 1,000 new cases were registered—or double the 1929 enrollment. The known cases of tuberculosis numbered 1,529 as compared with 1,445 in 1931.

In spite of these increases, economic circumstances caused the closing of one tuberculosis clinic with a reduction of weekly sessions from 8 to 5; and the reduction of child welfare clinic sessions by over 100 for the year. Other important personnel cuts, including the bureau of health education, are noted. The staff was reduced from 153 persons in 1931 to 129 in 1932, with a budget reduction of approximately \$50,000. The *esprit de corps* of the employees is praised and reference is made to volunteer assistance. Services were rendered by the welfare division of the Federation of Women's Clubs in well baby clinics, by the Junior League at the medical dispensary, by Mothers' Clubs, and by the Onondaga Health Association in promoting health educational activities, as well as by the Public Health Committee of the Syracuse Academy of Medicine.

Among other worth while experiences which have so far come out of the depression adjustment service should be mentioned the real advantages of the consolidation of infant and preschool clinic services, as well as the consolidation of the food and sanitary inspection services. On the other hand, half-time nursing service cannot be called a success and should be corrected as soon as possible. A proposal advanced during the early part of the year to permit the sale of raw milk directly by the farmer was definitely vetoed. In fact, an amendment of the sanitary code, prohibiting the sale of any raw milk other than certified, was the final outcome which left the Bureau of Food Inspection in a stronger position.

Montclair, N. J.—In 1932 this city of 44,572 population expended through its health department \$1.12 per capita. Of the total deaths, 56 per cent occurred among persons 60 years of age or older, 16 per cent being 80 years of age or over. There were 124 deaths from dis-

eases of the circulatory system, 47 from cancer, and 31 from tuberculosis. The low infant mortality rate of 38 is noteworthy.

A physical examination was made of each school pupil, including eyes, ears, teeth, tonsils, chest, heart, posture, and general mental aptitude. Each student was also weighed and measured. Children with physical defects were followed up and more coöperation than previously was enlisted from the family dentist and physician. Physical examinations were also made of 980 food handlers.

During the year, 2,000 families received some form of public health nursing service in their homes. This represented some 5,000 individuals with a total of 32,956 nursing visits or an average of 13 visits per day per nurse. There were 10,137 clinic visits of various kinds. The nursing service includes all follow-up work from the prenatal and post-partum clinics and ward maternity cases of the hospital. The nursing bureau also investigated all calls coming to the Department of Public Welfare for physicians.

Standing orders have been received from the town physician for patients under his care, which are carried out by the nurses, and many times eliminates the necessity for a call from him thereby decreasing the cost of medical care.

**National Society for the Prevention of Blindness**—Progress in the program designed to eliminate the principal diseases causing blindness and to reduce eye injuries to a minimum is shown in the Society's Annual Report, entitled "Twenty-Five Years of Saving Sight." The report discloses a growth of membership from the 10 public-spirited men and women who organized the Society a quarter-century ago to 16,600 members throughout the United States; it discloses, also, that activities have been extended, in collaboration with the medical profession,

the field of education, organized labor, the safety movement, social work, governmental agencies, and other groups. The report says:

Throughout the past year the National Society for the Prevention of Blindness has had evidence that the economic crisis will have its effect on the eyesight of the future. The Society believes it has reached a high level of accomplishment in a depression year, when every economy was required. The organized movement began in 1903 as a campaign in New York State against blindness from ophthalmia neonatorum. It evolved into a nation-wide movement in 1915 when the New York State Committee for the Prevention of Blindness became a national committee. As a result of adoption of laws, in most states, requiring doctors, nurses, or others in attendance to put prophylactic drops in the eyes of babies at birth, and the constant educational activities of the Society, the frequency of ophthalmia neonatorum as a cause of blindness among children admitted to schools for the blind has diminished each year until now it is approximately 75 per cent less than in 1908. Complete eradication of this source of blindness—once the most prolific of all causes—is regarded as scientifically possible.

Another aspect of the movement is the work of "sight-saving classes" for the education of partially-seeing school children. In these classes, children with seriously defective vision are provided with books in large type, good lighting and specially trained teachers; the children are given an opportunity to receive an education and vocational guidance, while their remaining vision is conserved. The number of classes has increased from the 2 established in 1913—one in Boston and one in Cleveland—to 421 now maintained in 121 cities throughout the United States. Despite the depression, 15 new sight-saving classes were established in 1932; the most recent being one planned for Waikiki, Hawaii. The report points out, however, that

... there are still 45,000 children in the United States who have such seriously defective vision that they cannot receive their education in the regular classes, but should be in sight-saving classes.

In its campaign against the eye hazards of industry, the Society coöperates with state labor departments, industrial journals, insurance companies, trade associations, universities and vocational schools, safety engineers, and others professionally concerned with industrial accident and health problems. During the past year the Society sought, particularly, to arouse the public against dangerous fireworks and toy firearms, which constitute serious hazards to children. A survey conducted by the Society revealed that many children lost their sight as the result of accidents while playing with such toys.

Some communities have laws regulating the sale of fireworks, but there is great laxity throughout the country in enforcing these laws. The Society has secured the coöperation of governors, mayors, local safety councils, and influential citizens, generally, in its effort to stamp out this menace to childhood. While legislation is necessary, the major responsibility rests with parents and teachers. The publication of *Eye Accidents in Child Play* crystallized sentiment on this subject and resulted in additional and more stringent laws in some cities.

The report points out that special clinics have been established in New York, Philadelphia, and Cincinnati for cross-eyed children whose parents cannot afford the long and expensive treatment under the care of a private physician.

While it may be too soon to forecast the success of the work being done in these centers, it is hoped that it will prove an added accomplishment in the program of saving sight. It seems almost inexcusable that there should be any children left with cross-eyes, when we realize that it is an affliction which usually can be corrected early in life. "The cross-eyed child is frequently a behavior problem because he is self-conscious and suffers from a sense of inferiority. Unfortunately, it is popularly believed that cross-eyes can be outgrown. Parents often neglect to have the

defect in their children's eyes corrected until too late to avoid the physical or psychic involvements. The Society is striving to inform parents, through popular literature, lectures, and the newspapers, of the urgency of early treatment for the young cross-eyed child."

Ministry of Health, England—Annual reports of the chief Medical Officer of the Ministry of Health of England abound in information and stimulating discussions of much value to health administrators. The 1932 document is no exception to this rule. The statistical tabulations are models of completeness and accuracy.

During the last 40 years of the 19th century, infant mortality in England and Wales was almost stationary, but in the present century it has been reduced by more than half. The decline is greatest at 3–6 months and least in the first month of life. The most important decline in recent years was in bronchitis and pneumonia and in diarrhea and enteritis.

Speaking generally, the infant mortality rate is highest in the county boroughs and in the north of England, and the decline has been greatest in the small towns and in London.

A table shows the deaths recorded by individual years since 1900, the number which would have been recorded, had the rate of mortality observed over 1901–1910 still prevailed, and the difference. Hence, in 1932, in this area of 39,988,000 people, there were 39,933 infant deaths, with 38,655 less deaths than if the earlier rate had prevailed.

It cannot, I think, be doubted that this is to a large extent due to increased maternal care of the new-born child. There has, of course, been an improvement in the external environment of the child, sanitary, social, and domestic; but after all is said about the influence of external improvements, it has to be remembered that the "environment" of an infant under 12 months of age is mainly its mother. . . . With a declining birth rate it may be said that it is imperative that the nation should save the newly-born if it is to sustain the population; but on the con-



trary, it may also be held that it is futile to save these lives unless they be properly reared and equipped for healthy and productive citizenship. Merely to save life, or merely to prolong it, is not enough.

In discussing the question of unemployment and national health, the author notes that any long sustained physical pressure or stress of serious degree represents itself ultimately in a rise in mortality, particular or general. He emphasizes the importance of observing the secular, or century, trend in physical evolution of a race and the need to cultivate a historical sense. Of two facts, he says, we may be sure. First, there is taking place a great improvement in the physical condition and health of the people—life is longer and its physical character is better than in former centuries in England. Second, he indicates that "We possess, for better or worse, a more sensitive humanitarianism for human pain and distress than formerly, and fuller means of expressing it."

Reference is made to the health insurance service in which 16,000 doctors are at the medical service of 16 million persons over 16 years of age, with cash benefit, medical and disablement benefit, and a series of additional benefits for dentistry, nursing, etc. Where, by failure to pay contributions due to unemployment, these persons may cease to be entitled to the insurance medical benefit, they can, in their need, have recourse to the public assistance medical service which is to a large extent rendered by the same medical practitioners as serve on the panel. Some 8 millions receive such benefit every year.

Though unemployment itself seems to be an unmixed evil, it must not be forgotten that in innumerable instances the unemployed person has more fresh air, exercise, rest, and freedom from industrial risks and restrictions than fall to his lot when he is employed. Again, the community, as compared with pre-war years, has realized the health and economic advantages of increased sobriety. Lastly, there is the ever-spreading practice of per-

sonal hygiene in dietary, clothing, exercise, cleanliness, and an open air life, which is rendering an immeasurable profit in life and health to the population as a whole.

Baltimore, Md.—In the 118th annual report of the Department of Health, 1932, the departmental organization is set up in three sections—administrative, medical (including nursing and dental), and sanitary. Vital statistics, public health education, and health district work are included under administration. There are 13 consultants to the department, this board having been appointed in 1932. An air view of Baltimore and the eastern health district adds interest and serves to orient the reader in considering the new district development. The district comprises the 6th and 7th wards, and includes a population of some 60,000 people, of whom 21 per cent are colored and 13 per cent are foreign born. Other accomplishments of the year included the completion of a health and hospital survey by the U. S. Public Health Service, the establishment of a satisfactory relationship with the public health committee of the city medical society, and the clarification and extension of several important services.

The health of the city, as reflected in statistics, was good in comparison with other years. A general death rate of 13.1 and an infant mortality rate of 62 were new low records. In the field of public health education, notable progress was made. The *Baltimore Health News*, issued monthly, reached some 8,875 readers. There was inaugurated a permanent radio health service. Negro Health Week was featured. The coöperation of 50 motion picture houses was enlisted to show during the diphtheria prevention campaign a trailer which was viewed by a half million people. There were also shown 35 other motion pictures to audiences totalling nearly 12,000. Demonstrations, exhibits, round-table

discussions, and a health contest were included in the program. Some 724 newspaper articles were prepared (6,771 column-inches devoted to public health), and 815,086 pieces of health literature were distributed to 89,540 persons.

The health district project, first proposed in 1921 by Dr. William H. Welch, was launched during the year. Co-operating with the health department and the School of Hygiene were several voluntary health agencies including the Babies' Milk Fund Association and the Instructive Visiting Nurse Association.

Among the purposes of the development are: The furnishing of facilities for the systematic training of health officers, public health nurses and other workers who might be employed by official or nonofficial agencies conducting public health activities in the city, of pupil nurses in hospital training, and of students of public health; as well as the making available of a field for more precise and instructive study of numerous public health problems, both administrative and epidemiological.

**Canadian National Committee for Mental Hygiene**—The report of a survey made of this organization in 1932 by the Canadian Medical Association reveals in an enlightening manner the stages of development, and the extent of present services, and provides recommendations for future guidance of committee work. Caution is expressed to prevent the work from becoming too diffuse, and it is suggested that the National Committee study public health services in Canada, particularly as they apply to municipalities and counties, with a view to the inclusion of mental hygiene in public health and the raising of standards of official health services.

The National Committee needs to determine its program for mental hygiene as part of public health, and, at the same time, to consider the standards of public health service, for it can be expected that mental hygiene will be effective in public health in proportion

to the effectiveness of the whole, this in turn being dependent upon the standard of public administration established.

The report contains a detailed plan, or proposed organization, for the future which divides the work into 8 divisions and provides for four permanent committees, including education, research, service, and public administration. The first of 16 specific recommendations urges that the committee promote the training of mental hygiene leaders, and undergraduate instruction for professional workers; and that they give particular consideration to instruction to undergraduates in medicine, to nurses and teachers in training, and to physicians and nurses who are preparing for public health work.

**Suffolk County, N. Y.**—In the fourth annual report of this county department of health, reference is made to the supervision of 450 boarding homes, requiring the full time of an inspector who makes quarterly inspections in accordance with law. These homes bring an income to their operators of some \$125,000 a year. There were also 29 licenses refused during the year. Maternity homes are likewise supervised and licensed.

Sanitation receives much attention in the county, including sanitary surveys of private wells, public water supplies, Huntington Harbor and Lake Ronkonkoma. Public health nurses are assigned to townships for generalized services, although bedside nursing is done only in case of emergency or for demonstration. The health department budget for the year ending October 31, 1933, was \$86,000 for a population of 166,205 (1931). An infant mortality rate of 50, a birth rate of 15.4, and a death rate of 16 are recorded for the year 1931, including institution figures.

# LABORATORY

## RAPID AGGLUTINATION TECHNIC APPLIED TO *B. PERTUSSIS* AGGLUTINATION

PEARL L. KENDRICK, Sc.D., F.A.P.H.A.

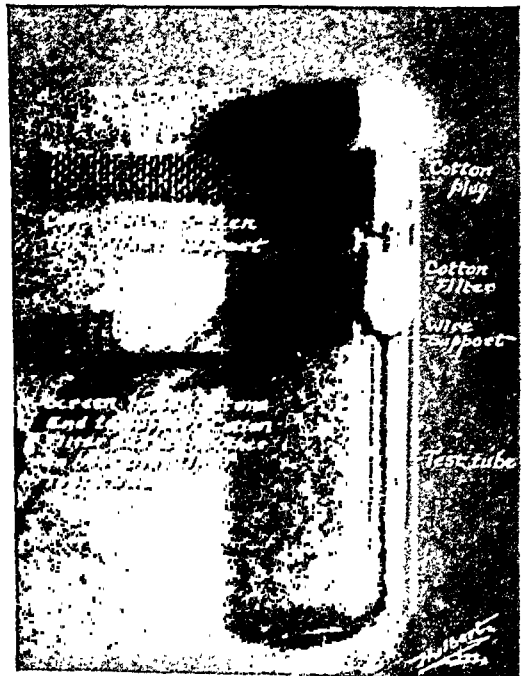
*Associate Director, Bureau of Laboratories, Michigan Department of Health,  
Western Michigan Division, Grand Rapids, Mich.*

WHEN first using the agglutination reaction in testing cultures of *B. pertussis*, the usual technic was employed. Five tenths c.c. of each serum dilution was mixed with 0.5 c.c. of culture suspension and the mixtures incubated at 55° C. for 4 to 5 hours and then placed at room temperature. Readings were made at the intervals selected by Leslie and Gardner<sup>1</sup>—at 4½ hours—and again after the tests had stood over night. Considerable difficulty was experienced in the interpretation of results because of the tendency of *B. pertussis* suspensions to settle out in a somewhat mucoid clump after standing for a time. Differentiation of this non-specific factor from true agglutination was not always easy and end-points were indefinite. It seemed possible that the rapid agglutination technic devised by Miss Noble<sup>2</sup> might overcome the difficulty since the readings would be made before the suspensions had an opportunity to settle. Only a few series of tests were needed to demonstrate the superiority of the procedure, and it is now used exclusively in our study of *B. pertussis* agglutination. The details of the procedure follow:

*Antigen*—The 48-hour growth of *B. pertussis* on a Bordet-Gengou slant is transplanted to a half Petri plate of Bordet-Gengou medium. After 48 hours' incubation, the growth is removed with a stiff, bent needle and emulsified in 1½ c.c. of physiological salt solu-

tion. The suspension is filtered and adjusted, if necessary, to a turbidity of approximately 10 billion organisms per c.c. by comparison with a standard.

Filtration is an important step in obtaining satisfactory, smooth suspensions. Test tube filters are prepared for this purpose. A thin layer of moistened cotton is shaped around the finger, placed on a simple copper wire netting support, and inserted in a 5 by 5/8 tube, the free end of the wire strip being bent to hook over the lip of the tube. The cotton is molded against the walls of the tube by means of a wooden applicator. These filter tubes are



plugged with cotton and sterilized. The filter is easily removed after use and the plug reinserted. The accompanying photograph shows the filter support and the completed test tube filter.

For a larger filter, a layer of gauze and cotton is wrapped around the outside of a square of wire netting cut from a bias strip and shaped to fit inside the neck of the bottle or flask of the desired size. The filter is suspended by two wires which cross under it, pass through the netting, and are hooked over the lip of the flask.

*Antiserum*—For preparation of a diagnostic serum, a rabbit is injected intravenously with a 10 billion per c.c. suspension prepared from a 48-hour growth of a recently isolated *B. pertussis* culture to which merthiolate 1:10,000 has been added at least 24 hours previously. The injection doses are 0.4 c.c., 0.8 c.c., and 1.0 c.c., respectively, at 3- to 4-day intervals. About 1 week after the last injection, the agglutination titer (equivalent, as explained below) has been around 1:20,000 in the six different rabbits treated by this method. The serum dilutions for agglutination tests are chosen according to the particular conditions. For testing cultures isolated by the cough plate method, the dilutions usually employed are 1:10, 1:100, 1:500, 1:750, 1:1,000, 1:1,500, and 1:2,000. For uniformity, the same dilution scheme is always employed and separate pipettes are used for the different dilutions.

*The agglutination test*—One-tenth c.c. of each serum dilution is mixed with 0.1 c.c. of antigen, the measurements being made with one c.c. pipettes graduated in tenths. For an antigen control, 0.1 c.c. of saline is mixed with 0.1 c.c. of antigen. The mixtures are shaken by hand for 3 minutes. For the shaking process, the racks are rocked at the rate of approximately 60 back-and-forth motions per minute and in such a way that the contents flow up the walls of

the tubes for about three-quarters of their length. After the shaking period, physiological salt solution is added for greater ease in reading. Because of its convenience, the Hipple pipetting apparatus, used in the Kahn test and set to deliver 0.5 c.c. of saline, is ordinarily employed.

*Reading the tests*—The tests are read immediately after the addition of saline and each tube recorded as —, ±, +, ++, +++ or ++++, according to the degree of agglutination. In the interpretation of the results in comparison with those given by other workers, a question arises because the final dilutions in the rapid test are not strictly comparable with those ordinarily given. This is of small consequence, however, provided the method of expressing the results is clearly stated. In the 0.2 c.c. mixtures of the rapid test, the series of serum dilutions 1:10 to 1:2,000 would give a series of final dilutions from 1:20 to 1:4,000. Any particular final dilution in the usual 1 c.c. test would contain five times the actual quantity of serum and antigen contained in the same dilution of the 0.2 c.c. rapid test. Therefore, if based on the actual quantity of serum present in the mixture, the series of final dilutions 1:20 to 1:4,000 of the rapid test would be equivalent to a series 1:100 to 1:20,000 in the usual 1 c.c. test.

*Experience with the method*—This rapid agglutination technic has been used for *B. pertussis* agglutinations for about a year. Repeated tests have been made with more than 130 recently isolated cultures and with a variety of stock cultures. The method has been used also for testing various antisera for *B. pertussis* agglutinins. The results have been clear-cut and consistent. The data on the serology of recently isolated cultures given in another communication on the cough plate method by Kendrick and Eldering<sup>3</sup> are based on this rapid method.

## SUMMARY

The rapid agglutination technic has proved far superior to the usual 1 c.c. test for *B. pertussis* agglutination. Most important of the advantages, the tests are completed before any difficulty arises from the nonspecific clumping effect observed in so many *B. pertussis* suspensions. The advantage of the rapidity with which the results are obtained is obvious. In addition, the

agglutination reaction is more clear-cut and the end-points are more easily determined.

## REFERENCES

1. Leslie, P. H., and Gardner, A. D. The Phases of *Haemophilus pertussis*. *J. Hyg.* XXXI:423 (July), 1931.
2. Noble, Arlyle. A rapid method for the macroscopic agglutination test. *J. Bact.* XIV:287 (Nov.), 1927.
3. Kendrick, Pearl, and Eldering, Grace. Report of a series of cough plate examinations for *B. pertussis*. In press.

## VITAL STATISTICS

The Importance of Tuberculosis as a Cause of Death in the Various Age Groups in the Population of Michigan, 1932—In spite of the constantly decreasing tuberculosis mortality observable throughout the United States, this disease is still one of the most important causes of death. Its importance varies in the different age groups and according to sex.

In a study of the ten principal causes of death among persons between the ages of 1 and 60 years in the State of Michigan in 1932, some interesting facts come to light. Excluding the deaths among infants under 1 year of age, tuberculosis as a cause of death appears among the ten principal causes in each age group up to 60 years for both males and females.

In the age group from 1 to 4, tuberculosis is the fourth most important cause of death among females and the fifth most important among males. In the age group 5-9, it appears in fifth place for both males and females with the same number of deaths for each sex.

Starting with the age of 10 years and extending to the age of 45, tuberculosis becomes a much more important cause of death than in the ages under 10. For children between the ages of 10 and 14, tuberculosis among females

takes first place and among males fourth place; then between 15 and 30 years it remains in first place for females and reaches second place for males. In the age period 15-19 years, this disease was responsible for 119 deaths among girls in Michigan in 1932 and for only 58 among boys. For girls, this number of deaths represents slightly more than 28 per cent of all the deaths in this age group; among the boys of this age, the number of tuberculosis deaths represents not quite 11 per cent of the total deaths.

From ages 30 to 35, it is the most important cause of death for both males and females. In the age group 35-40, tuberculosis becomes relatively less important among females than among males, being superseded among females by heart disease and cancer. Among males, however, it is the most important cause of death, being responsible for more than 15 per cent of the total deaths in this age group, as compared with 10.5 per cent among females of this age. In the age group 40-44, it remains at third place among females, and among males it is superseded only by heart disease. The number of tuberculosis deaths among males is more than twice the number among females, and represents 12 per cent of the total

deaths in this age group, while among females it represents only 8 per cent.

As middle age is reached, ages 45 to 49 years, the degenerative diseases become much more important, cancer and heart disease in particular. In this age group, tuberculosis among females has dropped to sixth in importance and among males to fourth. Owing to the higher mortality of males than of females above the age of 40, and to the greater importance of tuberculosis as a cause of death among males in the older age groups, it is reasonable that the number of deaths should be higher; but the fact that they are almost three times as numerous as among females is noteworthy. This discrepancy in the sex ratio of tuberculosis mortality is noticed also in the age group 50-54 years when tuberculosis claims fourth place in the causes of death among males as compared with seventh place among females. In the age group from 55 to 60 years it takes eighth place among females and seventh among males.—*Michigan Public Health*. 21:183-189 (Aug.), 1933; 21:208-212 (Sept.), 1933.

**Infant Mortality in New Zealand in 1932**—The most remarkable feature of the vital statistics of New Zealand for 1932 is undoubtedly the phenomenal drop in the already very low infant mortality rate. In 1930 this rate stood at 34.48 per 1,000 live births, a figure slightly in excess of that recorded for the previous year. The interrupted downward movement, however, was again resumed in 1931, and continued in 1932, when the rate fell to the unprecedentedly low level of 31.22 per 1,000 live births. This represents a decrease of 79 in the actual number of infants succumbing during the first year of life. During the last 5 years, the reduction in the total infant mortality rate has been due largely to the improvement in the male death rate, which has shown an uninterrupted de-

cline. The female rate, which is much lower than the male, has fluctuated somewhat.

By a more intimate study of the infant mortality statistics, obtained by breaking up the first year of life into smaller divisions, the effect of the influences which have been operating in recent years toward the saving of infant life is made more obvious. The most encouraging aspect of this year's infant mortality rate is the further substantial reduction in the rate for under 1 month. Prior to 1931, the long succession of improvements effected in the total infant mortality rate has been almost entirely due to the diminution in the figures for infants who survive the first month of life. Deaths due to what may be termed prenatal influences generally occur during the first month, and it is this group which has hitherto been least amenable to the efforts made to cope with infant mortality. However, the last 2 years have completely changed the picture, as substantial improvements have taken place in almost every subdivision under 1 month, even down to those occurring during the first day of life.

The decrease in the number of infant deaths registered in 1932, as compared with 1931, has taken place principally in the group "diseases peculiar to early infancy," and as these are mostly of antenatal origin, it would appear that herein lies the explanation of the falling death rate for infants under 1 month of age.

Closely related with the question of infant mortality is the problem of the stillbirth. In New Zealand stillbirths are included in neither births nor deaths. At the same time most of the causes of a child being stillborn are the same as those that would have caused its death within 1 month of birth had it been born alive. In other words, the antenatal factors are responsible largely for the high stillbirth rate and the high

mortality rate of infants under 1 month of age. The stillbirth rate in New Zealand shows a rising tendency, but this is not sufficient to reverse the trend of the declining infant mortality rate when stillbirths are taken into consideration with this latter figure. Indeed, the unusually large decrease in both the total number of infant deaths and of stillbirths for 1932 has had the effect of reducing the combined rate or "total infant-mortality" rate to an unprecedentedly low level. Whereas, however, the rate computed on the usual method indicates a decrease of 29 per cent during the period 1923-1932, the inclusion of stillbirths reduces the improvement to 19 per cent.—*Report on the Vital Statistics of New Zealand for 1932*, pp. X-XI.

**Causes of Death in Norway, 1931**—According to the *Statistical Year Book for Norway*, the death rate from all causes in Norway increased from 10.5, per 1,000 population, in 1930 to 10.9 in 1931. Similarly the infant mortality rate increased from 45.6 per 1,000 live births to 46.3.

It is interesting to note which causes showed increases and which showed decreases. Of the important epidemic diseases, scarlet fever and malaria were the only two which showed reductions in 1931 over 1930, scarlet fever having decreased from 2.0, per 100,000 population to 1.4 in 1931, and malaria from 0.3 in 1930 to 0.1 in 1931. Against these decreases, typhoid and paratyphoid fever increased from 0.7, per 100,000 population, in 1930 to 1.4 in 1931; measles from 0.4 to 2.0; whooping cough from 1.9 to 2.0; and influenza from 1.7 to 9.1. The great increase in mortality from influenza is reflected in the higher mortality rates from the other respiratory diseases. Acute and chronic bronchitis as well as pneumonia (lobar and unspecified) showed marked increases in 1931 over

1930. The death rate from pneumonia (lobar and unspecified) in 1930 was 38.3, per 100,000 population, and in 1931, 41.8. Tuberculosis, all forms, however, showed a slight decrease having declined from 149.5 in 1930 to 147.5 in 1931.

The increase in mortality from cancer from 127.4 in 1930 to 133.1 in 1931 was considerable, but not entirely unexpected. Similarly the increase in the death rates from cerebral hemorrhage, apoplexy, and softening of the brain from 86.9 to 90.7, per 100,000 population, and the increase in diseases of the heart from 82.5 to 85.3 is in accord with mortality trends in other countries. Slight increases were shown also in ulcers of the stomach and duodenum, and other diseases of the stomach; cirrhosis of the liver; and nephritis; the 1931 rates for these 3 diseases, respectively, were 6.6, 1.8, and 29.5.

Probably the most noteworthy reduction in mortality was in the death rate from external violence which showed a rate of 43.0 in 1930 as compared with 36.2 in 1931. Even suicides showed a slight reduction—from 7.2, per 100,000 population, in 1930 to 6.9 in 1931. Diarrhea and enteritis also declined greatly in 1931, the rate for this year being 6.9 as compared with 9.3 in 1930. Congenital debility and malformations decreased from 32.1 in 1930 to 29.1 in 1931, and total puerperal causes from 5.2 in 1930 to 4.4 in 1931. Slight reductions were shown in the mortality from appendicitis, hernia, and diseases of the female genital organs. *Annuaire Statistique de la Norwege*. 52.18 and 24-25, 1933.

**Maternal Mortality in England and Wales, 1932**—According to the Registrar General for England and Wales, the annual birth rate for that country has dropped to 15.3 per 1,000 live births in 1932—the fourth consecutive year in which a decrease in the

birth rate has been experienced. A counterbalancing factor is the decline in infant mortality from 66 per 1,000 live births in 1931 to 65 in 1932. The 1932 figure has been improved upon only by that of 60 per 1,000 live births registered in 1930. Total maternal mortality accounted for 5.37 deaths per 1,000 live births in 1932 in comparison with 5.55 in the previous year. However, analysis of the total number of maternal deaths brings to light the fact that, of this number, the puerperal causes alone caused 4.21 deaths per 1,000 live births in 1932—a slight increase over the rate of 4.11 experienced in 1931, while the non-puerperal causes resulted in rates of 1.16 and 1.44 in 1932 and 1931 respectively.

Since stillbirths are now registered as well as notified in England and Wales, figures based on total births (live births and stillbirths) should prove of interest when compared with rates based on live births alone. Total maternal deaths (per 1,000 live and stillbirths) accounted for 5.15 deaths in 1932, 5.32 in 1931, 5.36 in 1930; when based on 1,000 live births alone, child-bearing resulted in corresponding rates of 5.37, 5.55, and 5.59 in 1932, 1931, 1930, respectively. It will be observed that while the rates on a wider basis are lower than those based on live births only, the ratio of mortality in both groups remains practically unchanged.—*An. Rep. Chief Medical Officer, Ministry of Health, Year 1932*, pp. 77–78.

## PUBLIC HEALTH ENGINEERING

### REPORT OF COMMITTEE ON SCOPE AND POLICY\*

THE Committee on Scope and Policy has no formal report to make during the current year. The policy and procedure outlined by this committee and published in the Year Book for 1931–1932 are still regarded as a suitable guide for the Public Health Engineering Section. The committee has been in close touch with the Secretary of the Section and has advised with him with reference to preparation of programs in order that they might conform as nearly as may be to the policies laid down by the Committee on Scope and Policy.

Within the past few years public health engineers have been giving increased attention to the control of respiratory diseases in so far as this can be accomplished through engineering activities. In 1932 there was pre-

sented a report before the Conference of State Sanitary Engineers by the Committee on the Review of Opportunities of Sanitary Engineers in Communicable Disease Control of that organization, in which it was pointed out that there were many opportunities for the application of sanitary engineering principles to the control of communicable diseases transmitted through secretions from the nose and mouth.

This committee, on reviewing the relationship of physical environmental factors to the control of respiratory diseases was impressed with the lack of conclusive proof on many phases of modes of infection and found that there is still much difference of opinion among public health workers. The committee expressed a realization of the complexity of the problem because of the presence of many factors difficult of control, but felt that suitable research might open the way to control of certain of these diseases through public health engi-

\* Presented to the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.



neering activities. These activities include, among others, air conditioning in buildings in which there may be congregations of people, arrangement of interiors to prevent too close contact, dust control in interiors, and greater municipal cleanliness in public streets and public buildings.

Accordingly the Committee on Scope and Policy recommends that the Committee on Research and Standards of the American Public Health Association be requested to take such measures as

it deems expedient to stimulate research in connection with modes of infection and means of preventing infection in connection with respiratory diseases; also that it be recommended to the Committee on Research and Standards that public health engineers be invited to coöperate in such research.

PAUL HANSEN, *Chairman*

EARNEST BOYCE

A. E. GORMAN

J. F. SKINNER

H. A. WHITTAKER

## REPORT OF THE COMMITTEE ON FELLOWSHIP AND MEMBERSHIP OF THE PUBLIC HEALTH ENGINEERING SECTION\*

THE Public Health Engineering Section still remains the fifth largest of the Association's ten Sections. On September 1, 1932, the total membership was 449 (125 Fellows and 324 active and associate members). The figures for September 1, 1933, were 118 Fellows and 289 members, a total of 407.

Forty-six new members were secured during the past year and 88 were lost through resignation, lapsing, and death, making the net loss 42.

On September 1, 1933, there were 5 Fellows and 32 members whose current dues remained unpaid, compared with 74 unpaid members and Fellows last September 1.

Due to the necessity for strict economy in the Administrative Office, promotion efforts with engineers were kept to a minimum during the early part of the year. However, 2 months before the Annual Meeting a letter of invitation signed by the Chairman, together with a list of topics to be presented at the Annual Meeting, were sent to over 800 engineers throughout the

United States and Canada. About a dozen new members joined the section up to October 1, as a result of this effort, and returns are still coming in.

The Public Health Engineering Section secured this year the largest number of applications for Fellowship, having 14 out of a total of 62 applications to be acted upon at this meeting by the Governing Council.

Next year the committee plans to concentrate on the selected list of prospects it has prepared, and hopes to report a substantial increase in section membership by the time of the 1934 annual meeting. In this connection we should like to urge every member and Fellow of the section to assist wherever possible in strengthening his section by securing new members.

L. H. ENSLOW, *Chairman*

M. M. COHN

G. H. FERGUSON

L. S. FINCH

A. E. GORMAN

C. E. GREEN

A. P. MILLER

R. J. MORTON

C. L. POOL

L. B. REYNOLDS

E. W. STEEL

A. H. WIETERS

\* Presented to the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

# INDUSTRIAL HYGIENE

Annual Report, The South African Institute for Medical Research, Year Ended December 31, 1932—We are making several excerpts from this 71-page Report, as follows:

## DEPARTMENT OF INDUSTRIAL HYGIENE

*Animal experiments with dust*—While there is no difficulty in setting up lesions in rabbits, guinea pigs, and rats that have been exposed to dust, the condition produced is not a true dust-phthisis as met with in the human subject, owing, presumably, to certain differences in the structure of their lungs. Monkeys are now being used for this experimental work, and the dusts under investigation are blown direct into the tracheae. To start with, there was some difficulty in arriving at a suitable anesthetic, and, acting upon the suggestion of J. B. Quinlan, of Onderstepoort Veterinary Research Laboratories, a trial was made of Eukodal, and it has proved quite satisfactory for vervet monkeys. An injection of 0.01 gm. is given by the subcutaneous route, and within less than 5 minutes a tube can be introduced through the vocal cords. The animal does not lose consciousness, it is simply indifferent. Recovery is rapid, and there is no coughing. This investigation is being undertaken with three objects in view: (1) To produce a true silicosis. (2) To compare the behavior of other dusts with the behavior of  $\text{SiO}_2$  and to learn whether, in the presence of  $\text{SiO}_2$ , dusts become harmful which are harmless in its absence. (3) To follow the path of dust through the lungs. Is the different behavior of certain dusts related to a difference in their path of entry to the alveoli?

*Dust estimation: An inquiry suggested by the International Silicosis Conference, Johannesburg, 1930*—The Department of Industrial Hygiene is also directly interested in a number of problems and investigations through its collaboration with the Mine Air Committee of the Chamber of Mines and with the Miners' Phthisis Prevention Committee. Dr. Mavrogordato is the institute's representative on both these bodies, and has been actively engaged in the work described below.

The different countries and centers who have portions of their population employed in "dusty-trades" use various methods for the estimation of the concentration of air-borne

dust. These methods yield results which are not comparable with one another, and the International Silicosis Conference that met at Johannesburg in 1930 urged the need for a standard method. With a standard method the results secured by different procedures for dust-control could be compared. Information of this sort was not available, and the Conference felt the need for it.

The methods in use on the Witwatersrand are the konimeter and the sugar-tube. The untreated slides provided by the konimeter do not distinguish between phthisis-producing and other dusts, while the volume of air that can be sampled by the sugar-tube is limited by the melting of the sugar in moist atmospheres. With low concentrations of air-borne dust, samples of small volume are unsatisfactory. The Mine Air Committee of the Chamber of Mines has undertaken this investigation in their Dust-sampling Laboratory. Methods have been devised for the elimination of dust other than phthisis-producing dust from konimeter slides. The extent to which these methods may influence the apparent concentration of phthisis-producing dust is still under consideration.

With regard to the use of the sugar-tube for gravimetric-sampling, the practice of using cotton-wool as the filter had been discarded on the Witwatersrand in favor of sugar, because cotton-wool did not yield a constant ash-weight. A cotton-wool yielding a constant ash-weight is now available. Cotton-wool is an even more efficient catcher of dust than is sugar, and has the advantage of permitting large samples of air to be dealt with. One can sample up to 1,000 cu. ft. of air as compared with the 12 cu. ft. dealt with under the routine procedure. The small samples were secured by a hand-pump, and took some 10 minutes to collect; the large samples take several hours, and the air is drawn by a Bunsen injector. The total catch from the 1,000 ft. samples averages about 30 mg., as compared with the 0.35 mg. averaged by the 12 cu. ft. samples. The crude catch is treated as were the samples secured by the sugar-tube. It is first ignited to remove the cotton-wool and all organic matter, and then washed in boiling water to remove the water-soluble particles. Before the final drying and weighing, the dust is washed through a sieve of 350 mesh to the inch to remove gross particles.

The dust, after weighing, can be taken up in a measured volume of water and counted in a "deep-cell" as used with instruments of the hydro-konimeter type, thus combining gravimetric and enumeration returns from the same sample. The deep-cell affords the opportunity of determining the size-frequency of the particles in our air-borne dust underground. Some 70 per cent by number of these particles are found to be of the order of 2 microns or less. It is of interest to note that these large samples compare very well as to concentration with the routine small samples. One thousand cu. ft. is about 30 cu. m., while the routine samples dealt with a third of a cu. m. One was unhappy with the third of a cu. m. samples, because the ash of the filter-paper usually exceeded in weight the total amount of dust actually caught. It has turned out that both large and small samples give an average concentration of air-borne dust amounting to about 1 mg. per cu. m.

In connection with this inquiry, the Committee on Mine Air is making trial of the Greenberg-Smith Impinger, an apparatus of the hydro-konimeter type, which admits of gravimetric and enumeration returns being carried out on the same sample. The gravimetric returns compare to a satisfactory extent with samples taken at the same time with the sugar-tube or cotton-wool. By this method slightly less dust is caught per unit volume of air than is caught by the sugar or cotton-wool. It has the advantage of avoiding the necessity for correcting on account of the dust in the sugar or the cotton-wool ash. The dust enumeration is at present performed in the deep-cell, but more experience will be required before it will be possible to correlate enumeration returns with deep-cell counting with enumeration returns by ordinary konimetry.

The different methods in use here and elsewhere for securing gravimetric returns yield results varying within quite narrow limits. This inspires confidence. On the other hand, different methods of securing enumeration returns do not yield results which correspond with any pretense to approximation. All that can be said is that the results secured by the same method can be compared with each other. While there is no correspondence between the "counts" yielded by the different methods, there is very tolerable correspondence between the size-frequency of particles caught by the different methods. It is possible that the association of a gravimetric return with a size-frequency return will be the best way for the different countries to secure results comparable with one another. The objection

to size-frequency returns for ordinary routine work is that this procedure takes up too much time. It has never been suggested that all countries should adopt a standard method for all purposes; it was suggested that each country interested should return a limited number of surveys by the standard method.

*Studies Underground*—Various mines have been experimenting with encouraging results on methods of filtering off the air-borne dust by means of screens placed in the path of the air-current. The staffs of the Miners' Phthisis Prevention Committee appointed by the government and of the Committee on Mine Air of the Chamber of Mines have dealt with this work.

A certain amount of air-borne dust is unavoidable in mining, and a certain amount of water must be used to deal with it. Dust-surveys are undertaken with a view to tracing sources of avoidable dust, and during the past year, humidity surveys have been undertaken by the Committee on Mine Air with a view to tracing sources of unnecessary water. With the deep hot mines of the Witwatersrand it is becoming increasingly important to learn whether the relative humidity of the air can be reduced to a useful extent without prejudicing the position with regard to air-borne dust. This problem is a difficult one. Most of the shafts are timbered and have to be kept wet for various reasons; the air is nearly saturated by the time that it reaches the bottom of a wet downcast. If this saturated air heats up on its way to the working places there will be some depression of the wet-bulb unless more water is added, but the fall in relative humidity thus secured is hardly of a useful degree. It is no use scheming to control the water at the working places if the air reaches them almost saturated at their own temperature. The initial difficulty is to dry up these timbered shafts to an extent that will admit of air reaching the bottom at a relative humidity of about 80 per cent. Something is to be gained by doing away with what a golfer might call casual water arising from drippers and such like sources. This can be done if it is worth while. There remains the necessary wetting of the timbers to avoid distortion and fire risks. At present inquiry is directed toward finding means for so treating the water that evaporation is slowed down and safety secured with the use of smaller quantities and less frequent application.

#### PATHOLOGICAL DEPARTMENT

*Cases of Interest*—During the year a gas-sing accident occurred on one of the mines. This was subsequently stated to be due to

sulphuretted hydrogen, derived apparently from stagnant water which had been tapped in the mine. Several fatalities occurred, some within 24 hours and one 3 weeks later.

At the autopsies performed on those who died within 24 hours of exposure to the gas, the chief lesions found were as follows: An acute edema glottidis, an acute pulmonary edema with brownish colored fluid in the bronchi and trachea, and an acute gastritis; in the stomach gas was present in considerable quantities, which had the odor of sulphuretted hydrogen; this was not noted in the intestines. The blood was dark and fluid, but not chocolate colored. No evidence of sulphemoglobin was found on spectroscopic examination.

The man who died 3 weeks after the exposure expired very suddenly. During the 3 weeks his chief complaint was of some gastric disturbance; apparently, too, there was some vagal irritation, and his pulse was irregular, at times being slow, but there appeared to be little serious damage done, and he left hospital only to drop down dead suddenly.

The cause of his sudden death was not determined at autopsy nor even after histological examination of brain, lungs, liver, kidneys, heart, and stomach. The only lesion found apart from intense congestion of the organs was a gross subacute gastritis, the result of his poisoning by sulphuretted hydrogen.

It is suggested that his death was due to involvement of the vagus nerve in neuritis, initiated by the poisoning and continued by the gastritis.

*Lungs Examined for Silicosis and for Tuberculosis*—These examinations carried out on behalf of the Miners' Phthisis Medical Bureau, whose pathological work is carried out by the institute, numbered 491.

European cases accounted for 260, Eurafican for 4 and Natives for 227, of which groups, 164, 1 and 45 respectively, showed no evidence of silicosis nor of tuberculosis.

Tuberculosis, uncomplicated by silicosis, was present in 11 European, 1 Eurafican and 133 Native cases.

Silicosis, uncomplicated by tuberculosis, was present in 45 European and 11 Native cases.

Silicosis, complicated by tuberculosis, was present in 40 European, 2 Eurafican and 38 Native cases.

One case of primary lung carcinoma was noted among the European cases.

Gangrene of the lung, associated with enlarged tuberculo-silicotic gland eroding the bronchi, was noted in 15 Native cases.

*Additional Investigations (Pathological Department)*—During the present year two

separate investigations are being carried out, both dealing with silicosis, but on different lines.

The first deals with the pathology of the lungs of a male European who has been engaged in work connected with the Johannesburg sewerage scheme.

Some months ago Dr. Pringle, of the Springkell Sanatorium, performed an autopsy on the body of one of these workers, and, being struck with the unusual nature of the lesions in the lungs, forwarded them to the institute for further and complete examination. The pathological change was found to be an unusual type of gross, unpigmented silicosis.

Upon inquiry it was found that the danger had not been apprehended and that conditions under which these men worked were extremely bad. They worked either in unventilated tunnels or in deep open trenches, drilling with dry drills, and no attempt whatever was made to keep down the dust. The result was that the men were inhaling enormous amounts of dangerous dust. In some places, according to reliable analysis, the dust contains as much as 97 per cent free silica.

According to our observations so far completed, and taking the history into account, the pathological process set up is of a very advanced type, and is developed in a very short period of time.

In many respects the silicotic lesions are different from those which occur in the Rand miner, and, further, they approximate more nearly to the lesions met with in the experimentally dusted animals.

Up to the present it has been difficult to explain why the changes in the lungs of animals so treated do not correspond more closely to those of the natural disease as met with in miners. It is hoped, when this investigation is completed, that several problems relating to silicosis will be cleared up.

The second piece of work is a reconstruction model, magnified by 20 diameters, of the silicotic process, and shows how it involves the important structures in the region of the entrance to a primary unit of the lung.

With the help of J. de Bruyne, a technic has been evolved which has given very satisfactory results.

Since the model has been completed, we have learned that a similar technic has been employed by Millar in America, but our work has been done quite independently.

In our method a large series of serial sections, each 20 micro mm. in thickness, was cut and the required part in each section was photographed ( $\times 20$ ) directly upon bromide paper. Each completed negative photograph

thus prepared was then superimposed upon cardboard (0.4 mm. in thickness), and the image of the silicotic lesion with the adjacent structures in relationship with it was punched out. The punched-out objects were now accurately superimposed and pasted together, the final result being an exact replica, on a much enlarged scale, of the lesion and its related anatomical structures.

The model has been reconstructed strictly to scale in three dimensions.

The reconstructed model shows the distribution of the pigment and the silicotic nodule; it shows that fibrosis and pigmentation occur to a much greater extent than can be realized by ordinary histological examination; it confirms the view which we have long held that the silicotic lesion develops in certain definite anatomical situations in the lung substance; and it has given us reason to believe that the silicotic process causes gradual occlusion of the terminal air passages.

In this reconstruction, which is of an early silicotic nodule, the narrowing of certain parts of the terminal air passages is definitely shown, but a second model will require to be made of a nodule in a more advanced state to prove that actual occlusion finally occurs.

If the occlusion of terminal passages is definitely proved, it means collapse of the affected primary unit and will explain how the massive areas of silicosis are formed.—

Obtainable through the British Library of Information, 270 Madison Avenue, New York.  
E. R. H.

**Ventilation and the Need for New Standards**—The author feels that the contamination of the air by microbes has been unnecessarily submerged in present day thinking about ventilation, and he therefore suggests that dust counts or bacteria counts should be favored as a sounder basis for estimating the purity or otherwise of the air. The conditions which make for comfort should be clearly distinguished, when necessary, from those favoring health. Several pages of valuable discussion follow.—J. S. Owens, *J. Roy. San Inst.*, 53, 11:623-635 (May), 1933. E. R. H.

---

## Law of March 16, 1933, on the Daily Hours in Industrial Establishments

THE law of March 16, 1933, prescribes a maximum working day of 8 hours and a maximum week of 48 hours for persons employed in industrial establishments of any kind, whether public or private, except in the postal, telephone and telegraph services, inland navigation by water and air, the fishing industry, and establishments in which only the members of the same family are employed. The law does not apply to persons occupying executive or supervisory positions or to home workers.

Longer hours may be permitted regularly in occupations, among others, with

intermittent or simple processes, in those requiring little attention, in continuous industries, and in special preparatory or supplementary work that must be performed outside regular working hours.

Overtime work is permitted in case of emergency, when work must be done to machines or other apparatus, and to take care of extra orders, but shall not exceed 12 hours a week for a definite period.

The law is to be enforced by inspectors. Penalties are provided for violations.—*Rassegna della Previdenza Sociale*, Rome, June, 1933.

## FOOD AND NUTRITION

The *Escherichia* - *Aerobacter* Group of Bacteria in Dairy Products—The *Escherichia* - *Aerobacter* group comprises one of the important groups of bacteria in dairy products. Milk, even under careful conditions of production practically always contains some of these organisms. The fact that the *Escherichia* type generally represents organisms coming from the intestinal tract of man and animals and the *Aerobacter* type organisms from soils and grains makes a distinction between the two types useful. The growth of *Escherichia*-*Aerobacter* organisms in dairy products is undesirable, for in addition to forming acid and gas from lactose they produce undesirable flavors and aromas. Some of the defects which have been reported as due to this group of organisms are ropiness in milk and cream and gassy fermentations in cottage cheese, cheddar cheese, milk, and sweetened condensed milk.

Two methods were employed for isolating organisms of *Escherichia*-*Aerobacter* type from dairy products. In the first method gentian violet lactose bile broth was used as an enrichment medium. Durham fermentation tubes were isolated in duplicate with dairy products diluted in multiples of 10. Gas formation was recorded after 48 hours' incubation at 37° C. Eosin methylene blue agar plates were streaked from tubes of the highest and lowest dilutions showing gas after 24 hours' incubation. Typical colonies of the *Escherichia*-*Aerobacter* types of organisms were secured from these plates. The approximate number of *Escherichia*-*Aerobacter* organisms per c.c. was determined from the fermentation tubes, by the dilution method.

A direct plating method was used for the isolation of cultures, whenever possible. Milk or cream was plated directly with eosin methylene blue agar in dilutions of 1:10 or higher. Surface colonies were secured by placing the inoculum on the surface of the pre-dried E.M.B. agar plates and then distributing it uniformly with a glass rod bent at right angle. When all of the inoculum was absorbed upon the surface of the agar the plates were inverted and incubated for 48 hours at 37° C. The number of colonies of each type was then recorded and a representative colony of each type isolated for pure culture study.

Tests employed for identification of cultures were the methyl red and Voges-Proskauer tests, utilization of citrate as the sole source of carbon, motility, liquefaction of gelatin, reduction of nitrates, formation of indol, action on litmus milk, and fermentation of glucose, lactose, sucrose, dulcitol, and salicin, with acid and gas production.

In this study, 204 cultures belonging to the *Escherichia*-*Aerobacter* group were identified on a species basis according to the scheme of classification used in Bergey's Manual. These cultures were isolated from raw milk, pasteurized milk, raw cream, ice cream, ropy milk and cream, and from defective butter. The genus *Escherichia* comprised 63 per cent of the cultures from the raw milk; 57 per cent from pasteurized milk; 33 per cent from raw cream, and 31 per cent from ice cream. The genus *Aerobacter* comprised 26 per cent of the cultures from raw milk; 10 per cent from pasteurized milk; 57 per cent from raw cream; 56 per cent from ice cream; 100 per cent from ropy milk and cream; and 88 per cent from defective butter.

The intermediate group comprised 11 per cent of the cultures from raw milk; 33 per cent from pasteurized milk; 10 per cent from raw cream; 13 per cent from ice cream, and 12 per cent from defective butter.

The most common species in the dairy products studied were *E. coli* in the raw milk, *E. pseudocoloides* in pasteurized milk; *A. cloacae* in raw cream, ropy milk and cream, and defective butter.—M. W. Yale, *J. Dairy Sci.* 16:481 (Sept.), 1933.

**Vitamin Tests on California and Asiatic Dates**—Three varieties of dates were included in this study—Asiatic Hallawis, California grown Hallawis and California grown Deglet Noor. Three samples of each variety were tested. Asiatic Hallawi dates—pasteurized, unpasteurized and locally purchased pasteurized (Dromedary dates)—were tested for vitamin A. The pasteurized sample was also tested for vitamin C, and both the pasteurized and unpasteurized samples were tested for vitamin D. The vitamin A content was found to be nearly identical in the three samples, a small decrease being noted as a result of pasteurization or marketing conditions. No vitamin C was found in the amounts which the animals would eat.

Three samples of California grown Hallawi dates—all tree ripened, one fumigated with carbon disulphide, and one fumigated and commercially washed, were tested for vitamins A and D. The vitamin A content in the tree ripened and fumigated samples was found to be nearly the same as that of the imported Hallawis, but was much less in the washed sample. Slight vitamin D values were shown.

Three samples of the California grown Deglet Noor dates were tested for vitamins A and D. These were tree ripened, tree ripened and fumigated, and artificially matured. The vitamin A

content was found to be somewhat larger in the artificially matured sample of this date than in the Hallawis. No deterioration was noted as a result of either the maturation or fumigation processes used. Only the tree ripened sample was tested for vitamin D and only a slight antirachitic value was found.—Agnes Fay Morgan, *J. Home Econ.* 25:603 (Aug.-Sept.), 1933.

**The Pellagra-Preventive Value of Green Cabbage, Collards, Mustard Greens, and Kale**—Previous experiments have been reported (abstract, *A.J.P.H.* 22:93 (Jan.), 1932), on canned spinach, turnip greens, green beans and mature onions. It has been necessary to continue to employ the canned product in testing green vegetables for the reason that usually they are not available in the fresh state for a sufficient length of time to permit adequate feeding experiments. However, it has been shown that the pellagra-preventive factor is not appreciably affected by the heat incident to canning.

The basic diet in the case of the tests on cabbage and collards consisted of corn meal, cowpeas, flour, lard, baker's bread, canned tomato juice, cod liver oil, calcium carbonate, sirup iodide of iron, and dilute hydrochloric acid. This diet was supplemented daily with 482 gm., including the can liquor, of canned green cabbage in one case and canned collards in another. The test period in each case was 1 year.

While cabbage was found to contain the pellagra-preventive factor, it cannot be said to protect completely even in the generous amounts given, since 1 of 15 colored females on this diet developed pellagra in 7 months. However, in view of its adaptability, cheapness and seasonal availability, green cabbage may be considered a very practicable contributory source of pellagra prevention.

Canned collards were found to be a satisfactory pellagra-preventive supplement, since in a group of 16 colored females, 13 of whom continued the diet for 1 year, none developed pellagra.

In the test on mustard greens and kale, the basic diet was the same as in the case of cabbage and collards, except that baker's bread was omitted. The daily allowance was 533 gm. in the case of canned mustard greens, and 534 gm. in the case of kale. While mustard greens contain the pellagra-preventive factor, they cannot be regarded as a rich source of it. Of 14 white females on the kale-supplemented diet, none developed any symptoms of pellagra.—G. A. Wheeler and D. J. Hunt, *Pub. Health Rep.* 48:754 (June 30), 1933.

**Effect of Carbon Dioxide and Sodium Benzoate on Vitamin C Content of Orange Juice—**The processes used in this experiment were:

1. Freezing and storage in the frozen condition
2. Addition of not more than 0.1 per cent sodium benzoate to canned or bottled juice
3. Carbonation—that is, treatment with carbon dioxide gas under pressure previous to bottling and pasteurization

Two samples each of California valencia and navel orange juices which had been kept in frozen storage for 8 to 18 months showed antiscorbutic value fully equivalent to that of freshly extracted orange juice. A daily dose of 2 c.c. afforded complete protection in all cases.

A sweetened orange juice, similar to

preparations on the market, prepared in two forms—with and without 0.1 per cent sodium benzoate—was tested for antiscorbutic activity. This preparation appears to have at least two-thirds the vitamin C value of whole fresh orange juice, the diminution being due no doubt to the dilution with sugar. Sodium benzoate appeared to have no deleterious effect upon the vitamin C.

To study the effect of carbon dioxide upon the preservation of vitamin C, 5 samples of the orange juice products were prepared as follows:

1. Slightly sweetened valencia orange juice, diluted with water containing 0.1 per cent dissolved carbon dioxide
2. The sweetened juice, diluted with water but containing no carbon dioxide
3. Frozen, untreated, whole valencia orange juice
4. The frozen juice, packed in bottles, but pasteurized for 25 minutes at 63° C. and treated with carbon dioxide at a pressure of 2.5 kg.
5. The frozen orange juice, pasteurized as above, but without carbon dioxide treatment

Nearly complete protection from scurvy was provided when 8 or 9 c.c. daily doses of sample 1 were given. Sample No. 4 retained the full vitamin C value of the fruit juice which it contains, 6 or 7 c.c. being approximately equivalent to 1 c.c. of freshly extracted orange juice. It is not surprising that carbon dioxide treatment should have this protective effect when the sensitiveness of vitamin C to oxidation is recalled.—Agnes Fay Morgan, Catharine I. Langston and Anna Field, *J. Indust. & Eng. Chem.* 25:1174 (Oct.), 1933.



# CHILD HYGIENE

## A NEW RAMIFICATION OF THE DENTAL PROBLEM

JOHN OPPIE MCCALL, D.D.S.

*Director, The Murry and Leonie Guggenheim Dental Clinic, New York, N. Y.*

IT is no longer news that dental decay is one of the most, if not the most, prevalent human diseases and that the infections and functional disabilities which follow uncared-for dental cavities are a potent source of ill health. Medical men as well as dentists are concerned over the undermining of community health which is recognized as being progressively on the increase from this cause. For this reason much research work is being carried on in both medical and dental institutions in the effort to learn the ultimate causes of dental caries and the means for its prevention.

Pending the discovery of the solution to those problems, increasing efforts are being made to stem the growing tide of dental disease through various community activities directed toward the amelioration of the situation. These efforts follow two differing but related courses. One is the dissemination of such knowledge as is now available regarding means of preventing dental caries. This is carried on through the usual educational channels, with special emphasis on the application of preventive measures in childhood. The public school is a natural and effective medium through which these educational messages may reach the people. The other course is the provision of such operative treatment, both the filling of teeth and their prophylactic cleansing, as is feasible. Here, too, the school has been looked upon as constituting the proper *locale* for the carrying on of this activity.

This latter belief has been reached

partly by following the line of least resistance, and also the line indicated by the trend of professional concept as to the best means of attacking the problem of existing dental disease. That is to say, the school is the natural gathering place of virtually all the children in any community above the age of 5, hence it offers an opportunity to conduct dental examinations and give dental treatment on a community-wide basis. Also it has so far been the belief of the dental profession, as it has progressively studied the problem of coping with dental disease on a broad basis, that a program for giving dental care to be begun at the average age for entering school, that is, 6 years, would satisfy such criteria as might be set up for such a project.

It should be explained that the thought of giving dental care as a community project first attained a prominent place in dentists' minds about 30 years ago and at that time dentists began making voluntary surveys of various schools, to determine the dental conditions obtaining among school children. One of the outstanding facts brought out in these early surveys was the prevalence of serious damage suffered by the so-called 6-year molar. Since impairment of masticating efficiency and serious malformations of the dental arches were found to be due to early loss of this tooth, it soon became the rallying point of those who were interested in dentistry for children, and its preservation became the immediate goal of the pioneers in this movement.

The coincidence of 6-year molar eruption and school entrance, plus the convenience of established machinery for supplying the necessary contacts, served to make children's dentistry a school function.

At that time there was no appreciation on the part of either dentists or physicians of the influence of dental infection on the general health, hence little attention was paid to decay and abscess in the deciduous teeth. As the years have gone by, dentists have begun to realize the seriousness of focal infection resulting from decayed and abscessed teeth, even in the deciduous dentition. They have also found that much irregularity in the position of the permanent teeth, including the first permanent molar itself, is traceable to decay and loss of the deciduous teeth, especially the deciduous molars, and also that the incidence of caries in these teeth is showing an alarming increase. With the realization of these things comes the necessity for recasting the program of dentistry for children. While the first permanent molar still deserves serious consideration, it can no longer stand as the first point of attack in the community dental program. It is imperative that plans be developed for giving comprehensive attention to the deciduous teeth and to provide this care before the child enters the public school system.

In addition to the health consideration mentioned, the matter of economy dictates this move. It is less expensive to fill cavities while they are small, and there is good reason to believe that fewer cavities will form in a mouth receiving periodic care. With preservation of the deciduous teeth there will be less irregularity of the permanent teeth, and this means a lower cost for the care of these teeth throughout life. The argument for beginning dental care early in the preschool period is given weight by the following figures gathered

at The Murry and Leonie Guggenheim Dental Clinic in New York City.

This clinic began operation in its present building September 14, 1931. Up to October 7, 1933, 10,147 children have been received there as patients. The usual age of admission for new patients is from 2 to 10 years. There have been a few admissions over this age limit. Since all children in the clinic district who are financially eligible are received, the findings may be accepted as constituting a cross-section of the dental condition of the preschool and school population of Greater New York. Of these children only 230 were free from caries; this means that 97.7 per cent had one or more cavities of decay.

While these figures are higher than those usually given as the result of school surveys, they will not occasion surprise, at least to dentists. What may cause both surprise and concern to dentists and to all others interested in health matters is the way in which the percentages mount, beginning at an age well below that of school entrance.

In the absence of an organized means for registering all preschool children, dependence is placed on day nurseries and similar organizations and on letters to parents known to have children below school age. Figures for this group are not, therefore, reliable cross-section figures. When, however, we relate the percentage of caries shown below to the total percentage for all ages up to 10, given above, we are justified in believing that findings for the entire preschool population would coincide rather closely with those given. They indicate not only an early beginning but a rapid increase, in extent, of caries in most preschool children. Incidentally comparison of the total caries incidence with the figures for preschool children indicates that the 2.3 per cent average for freedom from caries is derived almost entirely through the inclusion of pre-

school figures in the total tabulation. In other words, caries is found to be practically universal among children of school age in New York City.

The following figures for preschool children are tabulated on yearly levels.

With increase in incidence of caries and number of cavities goes, naturally enough, increase in their size and probability of pulp involvement with its sequel of dental abscess. An alarming number of children entering kindergarten are found to have many unsavable teeth and to be in need of time consuming operations on those that are savable. It seems fairly obvious, then, that both health and economic considerations demand the setting up of machinery for the registration of all preschool children and the institution of

#### CARIES IN PRESCHOOL CHILDREN

2 years—32 patients

56% have cavities

35% have 1-6 cavities

21% have 7 or more cavities

Largest number of cavities in one patient—17

3 years—168 patients

83% have cavities

43% have 1-6 cavities

40% have 7 or more cavities

Largest number of cavities in one patient—20

4 years—425 patients

91% have cavities

36% have 1-6 cavities

55% have 7 or more cavities

Largest number of cavities in one patient—31

systematic dental care for them. The age of 2 would seem to be the logical age at which to start this program.

## PUBLIC HEALTH NURSING\*

### PUBLIC HEALTH NURSING AT THE INDIANAPOLIS A.P.H.A. MEETING

#### *First Joint Session*

Monday morning, October 9, the Public Health Nursing Section had a joint session with the Child Hygiene Section and the American Association of School Physicians. The comparatively small maximum attendance of 150 at this session was no index of the significance or interest of the ideas expressed in the papers. Although one physician insisted that school teachers should teach and if they could not, they should be fired, and that physicians connected with school systems should practise medicine, not teaching, the consensus of opinion as indicated in the discussions seemed to be that teachers need to be better trained to

teach both in their own special fields and in the field of health education—and school physicians and nurses could be more effective if they were more skilled in the fundamental principles of education.

#### *Business Luncheon* (Monday noon)

Elsbeth Vaughan, R.N., St. Louis, Chairman of the Public Health Nursing Section, presided.

The section voted to have the following new committees appointed.

1. On Historical Review and Re-statement of Objectives of the Public Health Nursing Section.

2. On Membership and Stimulation of Fellowships in the Public Health Nursing Section.

3. On Study of Nursing Services in State Health Departments in Coöperation with the N.O.P.H.N.

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

The following nursing Section Council and Committee representatives were elected:

*Chairman*—Pearl McIvor, Washington, D. C.  
*Vice-Chairman*—Naomi Deutsch, San Francisco, Calif.

*Secretary*—Eva F. MacDougall, Indianapolis, Ind.

*New Councillor*—Ann Heisler, St. Louis, Mo. (Term expires in 1938).

*Nurse Member on A.P.H.A. Nominating Committee*—Katharine Tucker, New York.

*Nurse Member on A.P.H.A. Membership and Fellowship Committee*—Alma Haupt, New York.

Lillian A. Hudson of New York is section representative on the sub-committee on Training and Personnel.

*Section Councillors* and years their terms expire are:

Ruth Houlton, Minneapolis, Minn.	1937
Amelia Grant, New York	1936
Elizabeth Stringer, New York	1935
Marguerite Wales, New York	1934

#### *The Tuesday Afternoon Nursing Section Session*

This drew an attendance of 260. Watch the *Journal* for Miss Wales' paper on "The Contribution of Public Health Nursing to Communicable Disease Control" which was discussed from the floor by Dr. Louis I. Dublin and Haven Emerson, M.D., of New York. The papers written by Agnes Talcott and Marion Randall were eagerly listened to, and every nurse sat on the edge of her chair drinking in what Alma Haupt had to say about "How to Fit Public Health Nursing into a Budget."

There were about a dozen men in the audience. We hope most of them were health officers. Dr. Peter of Cincinnati and Dr. Decker of Los Angeles were recognized among them.

#### *The Wednesday Morning Nursing Section Meeting*

"Team Play. Between Public Health Nurses and The Medical Profession" read by Dr. W. W. Bauer of the American Medical Association proved very

interesting, and the discussion of it by Louise Nichol, R.N., of the Illinois State Health Department was just as good. There was good natured disagreement between the two on some points, and a spirited discussion from the floor by Miss St. Clair, Miss Tucker, Mrs. C.-E. A. Winslow, and Miss Havey.

The second part of the morning program on the "Use of Laymen in Official Public Health Nursing Services" was discussed by Dr. Dowling of Alabama, Mrs. Blackstone of Wisconsin and Mrs. Trawick of Tennessee, the latter two emphasizing the rural point of view, and interspersing their papers with apt and witty stories. An interesting outcome of this last phase of the program was the eagerness with which the three speakers got together to compare notes after the meeting.

#### *The Thursday Afternoon Joint Session With the Indiana State Nurses' Association and the State League of Nursing Education*

The attendance was 360, the room was packed to hear Dr. John Sundwall of Michigan speak on "Health a Factor in Quality Nursing" and Mary Beard, R.N., of New York on "The Undergraduate Curriculum a Factor in Quality Nursing."

Marion Howell of Cleveland was unable to come to the meeting to discuss Miss Beard's paper, and Shirley Titus, Dean of Vanderbilt University School of Nursing, Tennessee, took her place. She put her discussion in the form of the following questions:

1. Is Nursing that is worthwhile quality nursing?
2. What place does health occupy today in social well-being?
3. Is the curriculum that emphasizes disease rather than health an adequate one?
4. Is a nursing school to prepare nurses for specialties?

5. Is public health nursing a specialty?

6. Can a nurse be effectively prepared for public health nursing if public health education has to be superimposed on hospital technics and ethics?

7. What to do about a curriculum which is a product of utility? Should it be arranged according to function?

#### *An Extra on the Program*

One of the most stimulating and helpful nursing sessions at the Indianapolis meeting was the luncheon meeting informally arranged by the N.O.P.H.N. for public health nursing executives on Wednesday at the Lincoln Hotel. Fifty nurses sat down together and when each introduced herself at the request of Miss Tucker one had to marvel at the great number of states and types of services that were represented by public health nurses who felt the Annual Meeting of the American Public Health Association was valuable enough to justify them in paying their own expenses to attend it, as many of them did. Predominating in the group were state supervising nurses, directors of visiting nurse associations, directors of official city health department nursing services, public health nursing course directors, etc. It was an elite group.

After the luncheon the group re-

mained and for 2 hours, under Miss Tucker's leadership, discussed Rules and Regulations No. 7 of the Federal Emergency Relief Administration as they applied to public health nursing.

The proposed schedule for the N.O.P.H.N. sessions and joint sessions for the Biennial Convention to be held in Washington, D. C., in April was furnished each nurse and there was a general discussion about it.

#### *More Personal*

One distinguished Fellow of the Public Health Nursing Section of the A.P.H.A. who attended the meeting was Miss Elizabeth Smellie of Ottawa, Canada, who is Superintendent of the Victorian Order of Nurses for Canada and Honorary Consultant in Public Health Nursing to the Ontario Health Department.

Miss Smellie and Miss Lillian A. Hudson of the Department of Nursing Education, Teachers College, Columbia University, spent an evening at the home of Dr. and Mrs. Willis D. Gatch where the main topic of conversation was public health nursing. Dr. Gatch is Dean of the Indiana University Medical School and Mrs. Gatch, Miss Smellie, and Miss Hudson are all alumnae of Johns Hopkins Hospital Nursing School. EVA F. MACDOUGALL

## EDUCATION AND PUBLICITY\*

Indianapolis in Retrospect—Our best attended session and one which held the audience to the end, was the "panel" meeting with the subject, "Is there a common objective in public education around which all health organizations can rally?" Dr. Winslow as chairman very skilfully held the group of panel members to a practical discussion of the question. Each member proposed an objective and through discussion, there were eliminated: the importance of periodic health examination; a campaign against quackery; the importance of adequate medical care for everyone; the value of personal health. The consensus of opinion, with the audience agreeing, was that all health agencies should join this year in stressing the importance of maintaining adequate public health services. A continuation of this discussion by local health councils might be well worth while. For further information on how to go about it write to Dr. H. E. Kleinschmidt who arranged this panel session.

The two papers which we believe will be of exceptional value to workers in health education are: Mary P. Connolly's story of how adult groups are brought together for health education in Detroit, and Dr. M. O. Bousfield's account of how best to reach the negro community with health education. These will be made available to *Journal* readers.

The Health Education Institute under Dr. Galdston's leadership was again a successful feature of the Conference program and it was voted at our business session to ask for its continuance another year.

With the prospect of a meeting next fall on the Pacific coast, there is likely to be an entirely new group for attendance at an institute.  
M. S. R.

The "Makings" for Magazine Articles—Data from the field are necessary for the writing of articles on public health topics. There is little doubt that many more articles would be published if varied information, interesting and valuable, could be supplied to writers.

The material is to be found in annual reports, research reports and studies of many types, clinic records, case stories, etc. A line or a paragraph, an incident or other example even, may provide an article angle or theme about which material may be assembled by the writer. Whatever will help to define or to explain a public health problem or situation will be useful.

Health councils and all other local and state groups of health workers are invited to discuss how to bring this opportunity to the attention of health agencies. Likewise every individual health worker is invited to collaborate in this effort for the common good. State departments and state associations could help in explaining the idea to local agencies.

Please ask the editor of this department at 130 East 22d St., New York City, for full information.

In Place of a Speech—There are a lot of ways to use spoken words in presenting ideas and information, without making a speech. A dozen or more examples will be mailed to you, if you will look them over, promising that if you discover an omission you will

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

briefly describe the omitted form. Please drop a postal card to the editor of this department.

**Objectives in Cancer Education—**Twelve pages on "Cancer Education in Massachusetts," by Dr. Mary R. Lakeman, form a valuable contribution to the study of resultful popular health education. These 12 pages constitute a chapter in *Cancer and Other Chronic Diseases in Massachusetts*, by Dr. G. H. Bigelow and Dr. Herbert L. Lombard. Houghton Mifflin Co., Boston. 1933. Says Dr. Lakeman:

The educational program as outlined presented these main objectives:

1. To give people of adult years sound information about cancer, so that they may act with intelligence when occasion demands.
2. To give wide publicity to the fact of the curability of early cancer.
3. To keep the people living in the neighborhood of each clinic informed of the day, hour, and place of the clinic.

It was considered to be of special importance that everyone become familiar with the cardinal signs which should arouse a suspicion of cancer; namely, the lump anywhere in the body, the unhealed sore, the unaccustomed discharge from a body orifice. Hence, during the first two or three years of the Massachusetts program the chief emphasis in all publicity given out was laid on these signs.

A definite effort is being made to change the attitude of mind toward cancer. Among older women, we meet on all sides an unwillingness to face the problem, a sense of horror which forces people to turn away when the word is spoken. This attitude seems to exist in far less degree among younger women. Taking advantage of the open-minded interest of youth, the department is now making a definite approach to college students of biology and other natural sciences, with the purpose of creating a more wholesome attitude toward the problem in those people who, because of their background are capable of grasping the significance of cancer research, and who are potentially leaders in their individual communities.

It was realized at once that if the incidence of cancer in Massachusetts were to be lessened it was of major importance that individuals showing early or suspicious signs of cancer be brought under medical observation much

earlier than had been the case in the past. Surgeons everywhere were bemoaning the fact that patients were coming to them far too late for hope of permanent relief, yet in many forms of the disease the same surgeons tell us that a large proportion of the cases are curable if proper treatment is applied in the early stages.

**Warmth of Speech and Cold Type—**A correspondent has sent us a copy of a press release issued by a public health agency. At top is "Press Service," to which our correspondent has added "The World's Worst."

The entire release reads much like a verbatim report of a talk built of rather showy, but unsubstantial words and phrases, loosely thrown together without aid of a good editorial blue pencil, even to secure accepted English grammar. Personality often helps a speaker to get by with careless grammar and slipshod thinking. Before you decide to turn a pleasant sounding speech into reading matter, listen to the sentences, *as* sentences. Note the percentage of facts or ideas per 5 minutes of talking time. Note especially whether loose ends of ideas are left hanging because the speaker intended to come back and fit them neatly into a larger idea later, but forgets to do it as new words intrigue him.

Hygeia, November, 1933—"Poisons at Home" (chemical dangers in modern homes); "First Eyeglasses at Middle Age"; "Stop That Cough!" "Feminine Beautification: A Quest from Ancient to Modern Times" (part I); "Anxieties and Worries"; "Training for Athletics and Health" (part II); "Must the Tuberculous Be Dependent?" (rehabilitation through work); "The Committee on Foods Accepts Bread"; "Posture"; "Sex Education (part V: The School Child)"; "Before Baby Is Two" (part I: "Making the Right Kind of a Home"); "Progress in Preventive

Medicine" (part IX); "Then—and Now: A Century of Progress in Surgery"; "I Want to Know: A First Physiology" (part III); "New Books on Health"; "Questions and Answers"; "School and Health," including "Wit and Humor: New Source of Power in Health Education"; "Teaching Health"; and "New Health Books and Teachers' Materials."—*Hygeia*, 535 North Dearborn St., Chicago, Ill. Nov., 1933. *Sample free.*

**"Damaged Lives": A New Motion Picture**—The new picture was introduced to public health workers during the A.P.H.A. meeting at Indianapolis. Says *Journal of Social Hygiene* (Oct., 1933):

After careful consideration, and study of opinions received from several hundred physicians, health and governmental officials, social workers, nurses, and representatives of religious, educational, and other organizations, the Executive Committee of the American Social Hygiene Association has agreed to endorse the motion picture drama "Damaged Lives" recently produced by Weldon Pictures Corporation and dealing with the subject of syphilis. The film, with a supplementary medical lecture film, is expected to be shown in selected representative theatres throughout the United States, the premier showing being at the Majestic Theatre in Boston, on September 15, with the coöperation of the Massachusetts Society for Social Hygiene, the Massachusetts State Department of Health, and other state and city agencies.

This represents the first union of forces between recognized health agencies and commercial producers in the United States in an attempt to combine the technic of sound motion picture photography with authoritative health information for showings in commercial motion picture theatres for paid admissions. In the opinion of competent medical and educational authorities, this union will have far-reaching and important results in adult mass education.

The production is the culmination of 5 years of study by motion picture producers, in coöperation particularly with the Canadian Social Hygiene Council and with the American Social Hygiene Association, regarding preparation of a modern talking picture drama which

might be a worthy successor to Brieux's "Damaged Goods," produced 20 years ago on stage and screen, and the Association's silent drama film, "The End of the Road," which was shown throughout the United States shortly after the World War in connection with the Government's campaign against venereal diseases. Competent critics of all three productions consider "Damaged Lives" by far the most potentially effective in its educational possibilities. It is an appealing human story, produced with extraordinary good taste, is well cast, well acted and well photographed.

The first public showing in the United States, held in Boston, was presided over by the State Commissioner of Health, with speakers representing the Boston Health Department, the dramatic editors of the city, and other groups. There was a distinguished group of patrons and patronesses. It would seem that other cities might make a significant event of the local showing of the picture. See *Journal of Social Hygiene* for additional information, and address inquiries to American Social Hygiene Association, 450-7th Ave., New York.

**Where to Find It**—The difficulties in tracing health education activities are illustrated by one of the best annual reports. "Educational work" was found under "Maternity, infancy and child hygiene division." It was supplemented by 2 of the 7 sub-headings in the text. There was no tie-up between health education and "Nutrition service," another main heading. "Public health education division" carried 11 sub-topics. Other references: "Radio health talks"; "public meetings" and "radio health talks" under "Sanitation division"; "educational activities," "lectures," and "literature distributed" under "Social hygiene division"; and "educational activities" under "Tuberculosis division."

Could we have all of the above references recognized under "public health education" supplemented by a



cross reference under "health education, public"?

Likewise could there be an index clue to such specialties as "research," "surveys," "statistics," etc.?

The most elaborately indexed of all health organization annual reports contains no references to popular health education. One finds it as "films," "literature," etc., sub-titles under a variety of headings. The illustrations of health education activities usually included are not indexed at all.

The more adequate the indexing the more widely usable and useful will be reports of our own and other cities and states.

Invitations and Reminders—may at times be varied by some simple, inexpensive "dressing up."

Of course there are times when novelty especially if it gives a light touch to your facts or your announcement is inappropriate but there is a wide range of usefulness for non-solemn communications.

A memorandum issued by Social Work Publicity Council, 130 East 22d St., New York, tells how novelty papers may be used for inexpensively "dressing up" mimeographed or multi-graphed announcements and how attention-getting covers may be added to very modest invitations and other simple forms. Send 10 cents for a copy. Several samples of materials are attached to the memorandum.

Dear Editor: Would It Be Worth While?—We have urged that more use be made of good copy which has appeared in various health periodicals. Much that has been written for a single city or state, or a specialized national group, should have a wider audience.

Could we double the size of this department in the *Journal* we would like to fill the added space with sample quotations from journals and house organs, radio talks, news releases and printed matter.

Executives and editors who see many health periodicals may not realize how limited is the range of professional periodical reading by the rank and file. And the health reading of the general public is far more limited.

The subject of *method* in popular health education and publicity receives little attention in national, state and local health periodicals. Among national health journals only in the nursing field is much attention given to methods and materials for promotion and interpretation, except for the materials and projects of the national agencies.

True, more than 5,000 health workers have the opportunity of reading this department of "Education and Publicity" material in the *Journal*. But even that circulation does not cover all staff members of health agencies. Nor does it touch many of the board and committee members and other volunteers, nor the leaders in the countless organizations of men, women, and young people which carry some of the health education job.

Hence and therefore, dear editor, will you consider if you could quote from this department? In some cases you could quote what we have quoted, giving such credit to the original producers as may be fair and desirable. In some other cases you would give credit to the *Journal* and, if possible, to the Education and Publicity department. Try it tentatively?

A lot of material which already has appeared from month to month may be quite usable at the present time.

## BOOKS AND REPORTS

**Practical Medical Dictionary—**  
*Thomas Lathrop Stedman, A.M.,  
 D. (12th ed.) Baltimore: Wil-  
 Wood, 1933. 1256 pp. Price,  
 \$7.00, Thumb Indexed, \$7.50.*

the 12th revised edition of this Dictionary which has had an established place with the profession since its first issue in 1908. The present work has had about 1,000 new words added to it and several hundred new sub-titles. It includes also all the changes in the British Pharmacopoeia of 1932. This increase in words has necessitated the addition of 33 pages.

It is manifestly impossible to read every word in a dictionary. One is reminded of the young man who was reading a dictionary, and when asked how he liked it, said he found it "very interesting though it changed the subject too often." By looking for a number of new and test words we arrive at the conclusion that the dictionary is very complete and up to date. An appendix gives a table of drugs, their doses, and uses; weights and measures; comparative temperature and barometer scales, and a list of the microparasites pathogenics for man and some animals. The printing and illustrations are of the high quality for which this publication has been noted. One can feel no hesitation in recommending it thoroughly to the profession. MAZYCK P. RAVENEL

**Fetal, Newborn, and Maternal Morbidity and Mortality—***White House Conference. New York: Appleton-Century, 1933. 486 pp. Price, \$3.00.*

The subject matter of this conference report is divided into two parts. The first is a summary of the findings and includes a set of recommendations

and a bibliography. The second and larger part is devoted to a discussion of the various elements entering into fetal, newborn and maternal morbidity and mortality. It is in the form of a series of monographs with numerous reading references and on this section the summary and recommendations are based.

Inasmuch as the recommendations seem to include about all that present-day knowledge of the subject authorizes, they are given in full.

1. Efforts must be increased to provide better prenatal care for more women. In general, only early diagnosis allows adequate treatment of a disease which complicates pregnancy and is likely to harm mother or baby.

2. A warning should be disseminated that compliance with the insistent demand made by women for shorter and more comfortable labors inevitably implies risks both for mother and baby.

3. Interference with pregnancy or labor should be limited to well defined indications.

4. In view of the fact that abortions are responsible for a large part of maternal mortality and, particularly, for later maternal morbidity, all febrile cases of abortion should be hospitalized.

5. Appropriate changes should be made in official birth and death certificates so that more and more precise information can be obtained concerning the actual causes of death of either mother or infant in connection with pregnancy and birth.

It will be seen that nothing especially new has come of this study, but what is known has been worked into shape for easy reference.

MERRILL E. CHAMPION

**Our Movie Made Children—***By Henry James Forman. New York: Macmillan, 1933. 284 pp. Price, \$2.50.*

This book is a summary of the results of a 4-year nation-wide study by a group

of skilled investigators. In it we have a collection of facts secured in schools, colleges, children's homes, courts, and institutions of various kinds.

A popular opinion that most of the movie details go over the children's heads is thoroughly disproved by tests with 3,000 persons. "The amount that average children carry away is astonishing" and, strange as it may seem, they actually recall more of a picture at the end of a week than on the day after it was seen.

Emotional excitement has been carefully measured and found to be very great with most children. This is because they see the scene as actual life whereas adults can reason "it's only a picture." Since this emotion can be relieved only slightly in a theatre by physical action, it is especially dangerous.

Children's sleep is adversely affected by movies. This has been demonstrated with the "hypnograph"—a delicate instrument for recording restlessness. Either the sleep is more fitful than normal or it is in the nature of a drugged stupor, similar to that caused by extreme fatigue. Exciting pictures often show these effects on sleep for several days.

Easy money, fine clothes, luxury, wild parties, sex suggestions, exert an insidious appeal. Young people report the movies a liberal education in love-making with the sex side often over-emphasized. "The road to delinquency is heavily dotted with movie addicts and it needs no crusaders, or preachers, or reformers to come to this conclusion."

Everyone interested in the physical, mental, or moral welfare of children should read this book and take a positive stand against the evils that are exposed. Parents should consider carefully the seriousness of the facts and supervise the movie-going habits of the children as far as possible.

JOHN HALL

**A Short History of Dentistry—By Lillian Lindsay.** London: John Bale, Sons and Danielsson, 1933. 88 pp. Price, \$1.25.

With the increasing interest in dentistry as an aid to public health this little book is timely. Short as it is, it gives an excellent survey of the evolution of the science and art of dentistry. The many studies in various parts of the world, as to the effect of various foods on the development of the teeth and their health is another reason which makes this book valuable. Few advances were made until about a century ago but dentistry now occupies a safe place in the scheme of public health. We recommend this little book to all who are interested in this fascinating subject.

MAZYCK P. RAVENEL

**I Go Nursing—By Corinne Johnson Kern.** New York: Dutton, 1933. 256 pp. Price, \$2.50.

Nurses are often accused of being too inarticulate about the many human interest experiences they have in the round of their duties. Here is a nurse who has loosened up and given us a peep at life as she saw it and lived it while a pupil nurse in a large hospital nursing school, and later as a private duty nurse, the locale of whose activities ranges from San Francisco and its environs to a lumber camp on the Canadian Border and a cottage in the Canadian Rockies.

The nurse shows a keen insight into the psychology of her patients and unusual powers of observation. She gives the impression of being slightly "hard boiled" and cynical, yet she knows how to appeal to the reader's emotions. The book is decidedly interesting.

The experiences here depicted fall in line with what most people, who do not know much about nursing, traditionally think every graduate nurse meets; but most modern nurses will be indignant at the impression this book is apt to

give, that all nursing school supervisors are only professional snoopers and deserve only secret disrespect; that a nurse cannot get through some of the harrowing experiences of night duty without dopping herself on bromides or black coffee; and that a nurse can watch a patient die in a large hospital and, apparently without having a physician see him, prepare him for the morgue and, with another nurse, deposit him in the morgue.

EVA F. MACDOUGALL

*The Road to Health—Book I and Book II—By Herman M. Bundesen, M.D., and Corrine Manry. San Antonio: Laidlow Bros., 1932. Price, Book I, \$.52 and Book II, \$.56.*

The First Book gives a clear view of the fundamental health activities which should be carried out in the daily life of every child—the first need in child training. The different activities are emphasized in story form with colored illustrations.

The authors have written this Second Book to follow up the First Book, stressing the fundamental health activities which should be carried on daily. Lists of questions are given throughout which could be nicely correlated with the morning health review.

The illustrations are very well done and make the book interesting to the child of this age group. These books should prove valuable allies in carrying out a health-education program.

BESS EXTON

*Report on General Survey of the Problems of Sewage Treatment and Disposal in Willamette River Valley, Oregon—State of Oregon, Reconstruction Advisory Board.*

State-wide demand for abatement of stream pollution in the Willamette River Valley brought about the appointment of a consulting board by the Governor of Oregon, which studied the existing conditions, assembled data on

sewage disposal at the Willamette Valley cities and on the financial status of those cities, then pointed out definitely what improvements were needed in the 40 or more towns, cities or localities to bring about cleaner conditions in the Willamette River. The report is available at the office of the Reconstruction Advisory Board, Spalding Building, Portland, Ore.

ARTHUR P. MILLER

*Safety First for Little Folks—By Lillian M. Waldo. New York: Scribner, 1933. 165 pp. Price, \$.64.*

That safety education has definitely established its place in the elementary schools is proved by statistics which show a steady increase in fatalities for adults and for children of preschool age, and a marked decrease for children of school age.

The story centers around a little girl who dreamed that she took a trip to Danger Land and who tells of her experiences with the crippled children she met there. The safety lessons drawn are correlated with civic instruction to show children what the community is doing for their welfare and how they can cooperate. The book contains a number of illustrations.

A very good book for children of the third, fourth, and fifth grades if studied under the supervision of an understanding teacher.

BESS EXTON

*Frontiers of Medicine—By Morris Fishbein, M.D. Baltimore: Williams & Wilkins, 1933. 207 pp. Price, \$1.00.*

Modern medicine is so significant to the layman that the story of its progress from earliest times to the present should be as fascinating to him as to its own practitioners. In this little book, one of the Century of Progress Series, medicine's chief impresario has told the story concisely and well. About half of the book is devoted to medical history prior

to the glorious days of Pasteur, the chemist who founded the modern science of medicine, while the remainder is concerned with the present aspects of this profession, both as an art and a science. Preventive medicine is described in various chapters, although somewhat sketchily, due mainly to the limitations of space. The book is well printed but has no index. It should prove of interest to anyone who desires a succinct history of the development of medical science in all its branches, and will serve to inspire the reader with an appreciation of the scope and beneficence of this most important art.

JAMES A. TOBEY

with community public health nursing agencies. Standing orders, lists of equipment, records, methods, and procedures are outlined in detail. In fact, this book is to industrial nursing what the *Manual of Public Health Nursing* is to public health nursing in general, and should be available for all plant managers, industrial physicians, and nurses.

This book should be the starting point for further contributions in this field, contributions which will detail the various plans which are based on the fundamental principles of industrial nursing so ably given by Mrs. Hodgson.

VIRGINIA A. JONES

**Public Health Nursing in Industry**  
—By Violet H. Hodgson. New York: Macmillan, 1933. 249 pp. Price, \$1.75.

Industrial nursing has been the least clearly defined of all the phases of public health nursing. Because it has been under individual industry control, the administrative set-ups have been various, and the methods, procedures and programs have been very diverse, as have been the qualifications of the nurses employed. Books have been written about school nursing, visiting nursing, and tuberculosis nursing; but except for Florence S. Wright's brief monograph written 12 years ago, Mrs. Hodgson's book is the only one in the field of industrial nursing.

Plant managers and industrial physicians as well as industrial nurses will welcome Mrs. Hodgson's book in which for the first time is brought together the current practices of industrial nursing, and the definite objectives and principles of this service. The relationship of the nurse to the physician, the plant managers, the employees, and the community agencies is definitely defined. Suggestions are given for various types of set-up, both inside and out of the factory, including plans for affiliation

**To Be or Not to Be, A Study of Suicide**—By Louis I. Dublin, Ph.D. and Bessie Bunzel. New York: Harrison Smith and Robert Haas, 1933. 443 pp. Price, \$3.50.

Statistical study of suicide discloses some interesting facts which lead to a speculation as to causes in this complex problem. As a background for the study proper, the changing ideas of various groups and civilizations in connection with the act of suicide are presented. The author is well aware of the complexity of the problem, since it is bound up with the habits, customs, and standards of life of individuals and communities as well as with the value which these attach to life. He has carefully studied not only the records of the Metropolitan Life Insurance Company, of which he is statistician, but also official records here and abroad, and bases his analyses on data so obtained.

In the majority of countries studied suicide rates were higher during the years 1926 to 1930 than during the pre-war years 1910 to 1914, and a distinct upward trend was noted during the post-war period. Although the American negro is much less apt to commit suicide than the white, nevertheless other colored peoples show high rates, so that

suicide is not held to be primarily a racial trait. Analysis of suicides among urban and rural peoples shows a much higher frequency among the former. American data harmonize with a British study which indicates that suicide predominates at both ends of the social scale, although chiefly at the upper end.

The low suicide rate in Roman Catholic countries is thought to be related to the authority of the church in which members accept guiding precepts without question, and the church forms the background of communal life. Protestant suicide rates are distinctly higher than Catholic, but by far the greatest recent increase is among the Jewish population. The latter fact is startling since the Jews in pre-war times showed a low rate.

Other interesting chapters deal with such topics as a survey of the historical background, a discussion of law and life insurance, of the psychology of

suicide, and of the prevention of suicide. In the last chapter is a very interesting discussion on the development of the "well-adjusted adult"—the problem facing the psychiatrist, the layman, the parent, the church, the school, etc. The claim of the "necessity for evolving a sound philosophy of life" is one most of the readers will agree to.

Statistical data together with a bibliography are appended. The book throughout is most intensely interesting, shows a vast amount of research and study and careful deductions from the facts obtained. Suicide is a matter of the utmost importance from many different angles, and in this book we have a study which is enlightening and sound. It can be recommended to many types of readers, especially those who are in professions concerned in the social, religious, mental and medical aspects of life. E. W. STEARN

## BOOKS RECEIVED

**PATHOGENIC MICROORGANISMS.** 10th ed. By William Hallock Park and Anna Wessels Williams. Philadelphia: Lea & Febiger, 1933. 867 pp. Price, \$7.00.

**INDUSTRIAL HEALTH SERVICE.** By Leverett Dale Bristol. Philadelphia: Lea & Febiger, 1933. 170 pp. Price, \$2.00.

**AMERICAN RED CROSS TEXT-BOOK ON HOME HYGIENE AND CARE OF THE SICK.** 4th ed. By Jane A. Delano. Philadelphia: Blakiston, 1933. 391 pp. Price, Cloth, \$1.40. Paper, \$.75.

**PRACTICAL FOOD INSPECTION.** Vols. I and II. By C. R. A. Martin. London: H. K. Lewis & Co., Vol. I, Meat Inspection. 312 pp. Price, \$4.00. Vol. II, Fish, Poultry and Other Foods. 250 pp. Price, \$3.00.

**PHYSIOLOGICAL HEALTH.** Edited by Jay B. Nash. New York: Barnes, 1933. 308 pp. Price, \$2.00.

**GENERAL BIOLOGY.** By E. Grace White. St. Louis: Mosby, 1933. 615 pp. Price, \$3.00.

**CHILDREN'S SLEEP.** By Samuel Renshaw, Vernon L. Miller and Dorothy P. Marquis. New York: Macmillan, 1933. 242 pp. Price, \$2.00.

**POPULAR SCIENCE TALKS.** A Series of Popular Lectures on Thirteen Interesting Topics. Volume X. Edited by Ivor Griffith. Philadelphia: Philadelphia College of Pharmacy and Science, 1933. 307 pp. Price, \$1.00.

**THE HEALTH AND TURNOVER OF MISSIONARIES.** By William G. Lennox. New York: Foreign Missions Conference, 1933. 217 pp.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Nutrition Propagandists Take Note**—Research that throws some doubt on the marked anti-infective virtues of vitamin A is recounted here. The conclusion seems to be that under ordinary circumstances sufficient quantities of vitamin A are found in the usual diets recommended for children, and that a larger intake of vitamin A or carotene may be undesirable.

CLAUSEN, S. W. Limits of the Anti-Infective Value of Pro-Vitamin A (Carotene). J.A.M.A. 101, 18:1384 (Oct. 28), 1933.

**Another Survey of Colds**—Over a 3-year period, 3,000 persons reported an average of 2 cases of respiratory disease per year, half of which were head colds only. Another group of students reported 3 colds per year, three-quarters of which were head colds only. Sex differences were not significant but age and seasonal differences were.

COLLINS, S. D. and GOVER, M. Incidence and Clinical Symptoms of Minor Respiratory Attacks With Reference to Variation With Age, Sex and Season. Pub. Health Rep. 48, 38:1155 (Sept. 22), 1933.

**Bacteriological Successes and Failures**—We Americans are reticent about one thing—our mistakes. This paper by a British bacteriologist dwells as much upon the "boners" made by research workers as upon the glories of their successes. More of this honesty would make us a little more humble and a lot more understanding.

FLEMING, A. The Trend of Modern Research in Bacteriology. J. State Med. 41, 10:559 (Oct.), 1933.

**All About Diphtheria Prophylaxis**—Clear and concise, this straightforward statement of the principles of diphtheria immunization and treatment

should be on the tip of the tongue of every health worker to be passed on intact to uninformed or doubting lay persons.

HARRISON, W. T. Immunization Against Diphtheria. Am. J. Nurs. 33, 10:923 (Oct.), 1933.

**Measures of Health Administration**—The story of how municipal health department measuring grew introduces the uses of the *Appraisal Form* to sanitarians who may not be readers of our own *Journal*.

HISCOCK, I. V. Principles of Appraising Municipal Health Practice. Municipal Sanitation 4, 10:337 (Oct.), 1933.

**Of Interest to Pediatricians**—Cod liver oil has little if any value in promoting blood regeneration in anemia. This scientific candor emanates from one of the important oil producer's laboratories. At least, let us give the devil his due.

HOLMES, A. D., et al. The Value of Cod Liver Oil in the Treatment of Anemia. New Eng. J. Med. 209, 17:839 (Oct. 26), 1933.

**New Resuscitation Method**—An ingeniously devised rocking stretcher for the resuscitation of victims of suffocation is described. Its advantages over the Schafer prone pressure method are that greater air exchange in the lungs is effected, its operation requires less effort, and the victim can be kept warm more easily.

KILICK, E. M. and EVE, F. C. Physiological Investigation of Rocking Method of Artificial Respiration. Lancet 225, 5744:740 (Sept. 30), 1933.

**Why Mothers Die**—Surveying 285 maternal deaths in New York State, the author of this preliminary report concludes that over half may be ascribed

to faulty management, one-sixth to negligence of patient, leaving about a third in the non-preventable class.

KOSMAK, G. W. A Study of the Maternal Mortality of New York State. New York State J. Med. 33, 19:1143 (Oct. 1), 1933.

### How to Teach Health to Children

—Some of the advantages of the unit method of teaching health are that students become interested in solving specific health problems, and these problems have to do with living here and now. A practical example of the method is the author's "A Suggested Teaching Unit for Secondary Schools on Tuberculosis and Its Prevention," issued by the Massachusetts Tuberculosis League.

LATIMER, J. V. Unit Teaching in Health Education. J. Health & Physical Ed. 4, 8:10 (Oct.), 1933.

### Vitamin D and Dental Caries—

Studying the dietary factors in the control of dental caries, the author concludes that ordinary diets are more deficient in vitamin D than in the other vitamins, and that irradiation apparently was a more potent protection against this lack than the administration of viosterol.

MCBEATH, E. C. Nutritional Control of Dental Caries. New York State J. Med. 33, 18:1086 (Sept. 15), 1933.

### Venereal Disease Follow-up—

Recommendations for an effective city-wide social service for venereal cases, based upon a painstaking survey of the situation in one city (Boston), are no doubt applicable to most other cities in the United States.

MORRIS, E. H. Clinic and Field Agency Relationships in Syphilis and Gonorrhea Clinics. New Eng. J. Med. 209, 15:735 (Oct. 12), 1933.

### Betel-nut Chewing Exonerated—

Betel chewing is always listed among the exciting causes of cancer in the East. But it appears that betel is

chewed throughout India whereas the cancer area is localized in the tip of the Indian peninsula. This observer believes the exciting causes are not betel but the practice of holding a quid of shell lime and particularly vile tobacco in the mouth over long periods of time.

ORR, I. M. Oral Cancer in Betel-Nut Chewers in Travancore. Lancet 225, 5741: 575 (Sept. 9), 1933.

### Growth in Times of Stress—

In Hagerstown, a typical small urban community, the average of the weights of children was not substantially different in 1933 than in the predepression years 1921 and 1927. From the facts presented it is concluded that in this community those most in need of aid are getting sufficient food to maintain a reasonable standard of nutrition.

PALMER, C. E. Growth and the Economic Depression. Pub. Health Rep. 48, 42:1277 (Oct. 20), 1933.

### What Poverty May Be Doing for

Illness—Morbidity statistics, that we hope will forever put a damper upon the "what a healthy country we are" propagandists who have been so vocal since the business depression began, are provisionally presented in this preliminary report of a tremendously significant illness survey.

PERROTT, G. ST. J., *et al.* Sickness and the Economic Depression. Pub. Health. Rep. 48, 41:1251 (Oct. 13), 1933.

### Chemistry of Nutrition—Excellent

as a background for reading or discussion is this review of the scientific research leading to our present knowledge of nutrition. An invaluable panacea for vitaminophobia, mineralorrhea or milkitis.

SHERMAN, H. C. A Century of Progress in the Chemistry of Nutrition. Sci. Month. Nov., 1933, p. 442.

Contributions to Tuberculosis Case-Finding—Three allied papers on tuberculosis report upon Massachusetts



studies. One warns against waiting for symptoms in school children; the second points to pitfalls in X-ray interpretation; and the last to the improvements in the technic of treatment urging more widespread use of collapse therapy.

POPE, A. S., *et al.* Pulmonary Tuberculosis in Adolescents With Special Reference to Frequency, Diagnosis and Prognosis, etc. *New Eng. J. Med.* 209. 16:765 (Oct. 19), 1933.

**Protecting Workers From Radio-Active Paint**—Painting watch and clock dials with radio-active paint may be made safe if putting the brush in the mouth is prohibited, the material adequately protected, the factory kept really clean and well ventilated, and only cleanly workers employed. Specific directions are given.

SCHWARTZ, L., *et al.* Health Aspects of Radium Dial Painting. *J. Indust. Hyg.* 15, 5:362 (Sept.), 1933.

### Newer Knowledge of Pneumonia

—In this series of three papers there are presented: the prevalence of specific strains of pneumococci in contacts as contrasted with the general population; the taking of specific treatment measures to rural communities and the success achieved thereby; and the latest information on types and typing. We would do well to study all three papers.

SMILLIE, W. G., *et al.* The Epidemiology of Lobar Pneumonia, etc. *J.A.M.A.* 101, 17:1281 (Oct. 21), 1933.

**Effects of Ionized Air**—Should you fall under the spell of an "air ionizer," remember this conclusion: "under the conditions of the present experiments nothing definite was found to justify the use of artificial ionization in general ventilation." More extensive and critical experiments are under way.

YAGLOU, C. P., *et al.* Observation on a Group of Subjects Before, During and After Exposure to Ionized Air. *J. Indust. Hyg.* 15, 5:341 (Sept.), 1933.

## NEWS FROM THE FIELD

### THEOBALD SMITH GETS ROYAL SOCIETY PRIZE

THEOBALD SMITH, pathologist, of Princeton, N. J., was announced as the winner of the Copley Medal, awarded by the Royal Society, Great Britain's oldest scientific organization.

Dr. Smith was honored for his original research and scientific observations on the diseases of animals and men. He is 74 years old.

The London award tops a list of scientific honors bestowed upon Dr. Smith during a long scientific career. He received the Sedgwick Memorial Medal of the A.P.H.A. in 1930.

He was formerly in charge of pathological work with the U. S. Department of Agriculture. He was

Professor of Comparative Pathology at Harvard University from 1896 to 1915.

### ASSOCIATION OF WOMEN IN PUBLIC HEALTH

THE Association of Women in Public Health met at the Claypool Hotel in Indianapolis, Ind., October 8 and 9, as an affiliated organization of the American Public Health Association. A short business session was also held after the annual dinner and the following officers were elected:

*President*—Dr. Ada E. Schweitzer, formerly Director of the Child Hygiene Division of the Indiana State Board of Health

*Vice-President*—Dr. Ellen S. Stadtmuller, State Director of Child Hygiene, California

*Secretary*—Pauline Brooks Williamson,

Chief, School Health Bureau, Welfare Division, Metropolitan Life Insurance Company, New York, N. Y.

*Treasurer*—Dr. Grace Wightman, Chief of Child Welfare Bureau, State Department of Health, Springfield, Ill.

The following women were asked to serve on standing committees: Dr. Mary R. Lakeman, Boston; Dr. Clara E. Hayes, New York; Sally Lucas Jean, New York; and Mrs. Walter McNabb Miller, New York.

The Health-Know-Meter, which was prepared for the International Congress of Women held in Chicago in July was featured as a part of the Educational exhibit at the American Public Health Association meeting.

#### CHEMICAL LITERATURE TO BE COÖRDINATED

THE International Office of Chemistry has recently been created with headquarters in Paris with the following purposes: to render accessible to interested persons the existing literature of chemistry, to facilitate the registering, filing and diffusion of the literature now in course of production, and to insure coördination between documentation in chemistry and that of other fields of scientific knowledge. The address of the new organization is 49, Rue des Mathurins, Paris 8.

#### STUDY OF TYPHUS IN ALABAMA

A CAMPAIGN for the eradication of typhus is being launched in ten or twelve counties of southeastern Alabama, it is stated. The U. S. Public Health Service, with headquarters at Dothan, is conducting a study to determine the best methods of prevention and control of the disease. Dr. Adolph S. Rumreich is assembling the data.

#### ROCKEFELLER FELLOWSHIPS

THE Rockefeller Foundation has granted fellowships for a year's study at either Harvard or Johns Hop-

kins University medical schools to the following full-time county health officers:

Dr. Norris C. Knight, Sunflower County, Miss.—Member A.P.H.A.

Dr. Cecil J. Vaughn, Holmes County, Miss.—Member A.P.H.A.

Dr. Alton R. Perry, Washington County, Miss.

Dr. Millard C. Hanson, member A.P.H.A., of Mansfield, Ohio.

#### MALARIA LIBRARY

A MALARIA library was founded in Rome by the Stazione Sperimentale per la Lotta Antimalarica in 1925, and an *Index to Malaria Literature* is issued annually by the Station.

To make this as complete a central malaria library as possible they appeal to all malariologists to send books, reports and articles on malaria.

Photostat copies of any articles in the library can be had, on request, at cost production.

All publications and requests should be addressed to "The Director, Stazione Sperimentale per la Lotta Antimalarica, Corso Vittorio Emanuele 168, Rome (16)."

#### CHILD LABOR DAY

FOLLOWING its custom of nearly thirty years, the National Child Labor Committee has designated the week-end of January 27-29 as the period for the observance of Child Labor Day.

It is estimated that the industrial codes have released 100,000 children under 16 years from industry. Another 30,000 boys and girls 16 to 18 years have been removed from especially hazardous work. On the other hand there are still approximately 240,000 children under 16 years working in occupations not covered by codes. These children are employed largely in industrialized agriculture, such as the production of sugar beets, cotton,

tobacco, and truck farm products, in street trades, especially newspaper selling, and in domestic service. The National Child Labor Committee, 419 Fourth Avenue, New York, N. Y.

## PERSONALS

DR. LEROY A. WILKES, formerly of the American Child Health Association of New York, is now Executive Secretary of the Medical Society of New Jersey, with offices in Trenton.

DR. EUGENE C. PECK, member A.P.H.A., has been appointed Health Officer of Garrett County, Md., and also Deputy State Health Officer. Dr. Peck was formerly Assistant Health Officer of Newton, Mass.

DR. HENRY D. CHADWICK, member A.P.H.A., recently resigned as controller of tuberculosis of Michigan to become Commissioner of Public Health of Massachusetts, at Boston.

ROSS L. GAULD, M.D., of Jonesboro, Tenn., member A.P.H.A., has been appointed Health Officer of Maury County, Tenn., to succeed Hainan C. Busby, M.D., member A.P.H.A.

EDWIN T. RAMSEY, M.D., of Clark, S. Dak., member A.P.H.A., was elected President of the South Dakota Health Officers' Association at the annual meeting in Huron in October.

JAMES GEORGE MCALPINE, Ph.D., of the U. S. Public Health Service, member A.P.H.A., has been appointed Director of Laboratories of the Alabama State Department of Health to succeed the late Dr. Leon C. Havens.

DR. MORLEY B. BECKETT, formerly Health Officer of Isabella County, Mich., member A.P.H.A., has been appointed county field agent for the Michigan State Department of Health, largely for the study of the full-time county and district health departments.

DR. FREDERICK J. SWIFT, member A.P.H.A., has assumed his duties as

Deputy Health Commissioner of Iowa, with offices at Des Moines. He succeeds Dr. William W. Johnston, F.A.P.H.A.

## CONFERENCES

February 5-9, 1934, Third International Heating and Ventilating Exposition, Grand Central Palace, New York, N. Y.

Spring, 1934, Statistical Conference, International Statistical Institute, London, England.

March 29, 30, 1934, Annual Meeting of the American Association of Pathologists and Bacteriologists, Toronto, Ont., Canada.

April, 1934, Southeastern Section, American Water Works Association, Augusta, Ga.

May 9-12, 1934. Sixty-sixth Annual Meeting of the Dental Society of the State of New York, Buffalo, N. Y.

July 24-31, 1934. Fourth International Congress of Radiology, Zurich, Switzerland.

1935, International Congress on Mental Hygiene, Paris.

**Kellogg's**  
ALL-BRAN  
RELIEVES  
CONSTIPATION

## "HOW OFTEN Should I Shampoo?"

"ONCE a week, with DERBAC", doctors and nurses recommend. Silver Package for dandruff and pediculosis. Gold Package for regular use. Send 10c for 25c size trial cake.

CEREAL SOAPS CO.,  
INC., Dept. A-12,  
334 E. 27th St. New York

**Derbac**  
Speed SHAMPOOS



AMERICAN  
JOURNAL OF PUBLIC HEALTH  
*and*  
THE NATION'S HEALTH

VOLUME XXIII, 1933

INDEX

	Pages
January. ....	1- 96
February. ....	97-190
March. ....	191-304
April. ....	305-406
May. ....	407-546
June. ....	547-654

	Pages
July. ....	655- 773
August. ....	775- 894
September. ....	895-1016
October. ....	1017-1114
November. ....	1115-1222
December. ....	1223-1341

AMERICAN PUBLIC HEALTH ASSOCIATION  
450 SEVENTH AVENUE  
NEW YORK, N. Y.

# INDEX

	Page
<b>Abortus and Streptococcus Examination, Preservation of Milk Samples with Brilliant Green for.</b> C. S. Bryan.....	1182
<b>Actinic Sunshine as a Health Problem of Cities, Loss of.</b> Fred O. Tonney, M.D.....	775
<b>Activation of Milk by Direct Irradiation with Ultra-violet Rays, Antirachitic.</b> G. C. Supplee, Ph.D. ....	225
<b>Activities and Trends in the Laboratory Field.</b> George W. McCoy, M.D.....	318
<b>Acute Silicosis, Pathology of So-Called.</b> Leroy U. Gardner, M.D.....	1240
<b>"Acute" Silicosis, The Roentgenogram in So-Called.</b> Homer L. Sampson.....	1237
<b>Adamson, Elizabeth I., M.D. The Aim and Accomplishments of a Health Center Mental Hygiene Program.</b> .....	211
<b>Addition of Vitamin D Concentrate to Milk, The.</b> Theodore F. Zucker, Ph.D.....	10
<b>Administration of a Bureau of Tuberculosis in a City Department of Health.</b> H. R. Edwards, M.D. ....	591
<b>Adolescence, Mental Hygiene of.</b> William A. White, M.D.....	206
<b>Aerial Nuisances from the Refining and Burning of Petroleum Oils.</b> Stephen DeM. Gage. (Followed by Discussion, by Edward Wright, 192).....	97
<b>Affiliated State Public Health Societies. Year Book.</b> .....	27
<b>Agglutination in the Diagnosis of Enteric Disease.</b> Ruth Gilbert, M.D., and Marion B. Coleman. ....	693
<b>Agglutination, Rapid Agglutination Technic Applied to B. Pertussis.</b> Pearl L. Kendrick, Sc.D. ....	1310
<b>Aim and Accomplishments of a Health Center Mental Hygiene Program, The.</b> Elizabeth I. Adamson, M.D. ....	211
<b>Air, Apparatus for Study of the Bacterial Behavior of.</b> W. F. Wells.....	58
<b>Air Conditioning and Ventilation.</b> Editorial.....	603
<b>Air Contaminants on the Natural Light of Cities, Effects of.</b> H. B. Meller and Mary E. Warga. ....	217
<b>Air Pollution. Report of the Committee on Ventilation and Atmospheric Pollution.</b> Emery R. Hayhurst, M.D., Chairman.....	134
<b>Air Pollution:</b> See Aerial Nuisances from the Refining and Burning of Petroleum Oils. Stephen DeM. Gage. ....	97
See Effects of Air Contaminants on the Natural Light of Cities. H. B. Meller and Mary E. Warga.....	217
<b>Air Travel, Epidemiology and.</b> Editorial.....	828
<b>Allergic Skin Reaction in Brucella Infection and Immunity in Man, A Study of the Opsonic-Cytophagic Power of the Blood and.</b> I. Forest Huddleson, Howard W. Johnson and E. E. Hamann.....	917
<b>Amblyopia and Accompanying Physiological Disturbances in Carbon Tetrachloride Intoxication, Toxic.</b> Zolton T. Wirtschafter, M.D. ....	1035
<b>Amebic Dysentery in Chicago.</b> Editorial.....	1294
<b>American Public Health Association, The—Its Objectives and a Pledge of Their Attainment.</b> .....	5
<b>America's Contributions and Problems in Public Health. Presidential Address.</b> John A. Ferrell, M.D., Dr.P.H.....	1115
<b>Analyses of Six New York Beers.</b> Walter H. Eddy, M.D.....	704
<b>Anderson, Gaylord W., M.D., and Bigelow, George H., M.D., D.P.H. Diphtheria Immunization in Private Practice.</b> .....	655
<b>Anderson, John F., M.D., Leonard, George F., M.D., and Holm, August, Sc.D., Non-specific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer.</b> .....	681
<b>Annual Meeting, Sixty-second (Indianapolis). See Association News, Annual Meeting.</b>	
<b>Annual Meeting in 1934: Pasadena in 1934.</b> Editorial.....	1296
<b>Antigenic Value of Commercial Diphtheria Toxoids.</b> William Levin, Dr.P.H., and Helen A. Cary, M.D.....	1067
<b>Anti-Meningococcus Serum, Titration of the Neutralizing Potency of, by the Phenomenon of Local Skin Reactivity.</b> Grace M. Sickles.....	259
<b>Antipneumococcal Serum, A Test for Reaction-Producing Substances in Concentrated—Preliminary Report.</b> L. A. Barnes, Ph.D., and S. D. Kramer, M.D.....	616
<b>Antirachitic Activation of Milk by Direct Irradiation with Ultra-violet Rays.</b> G. C. Supplee, Ph.D. ....	225
<b>Antirachitic Milk by the Feeding of Dairy Cattle, Production of.</b> J. G. Hardenbergh, V.M.D., and L. T. Wilson, Ph.D.....	220
<b>Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer, Nonspecific Flocculation of Diphtheria.</b> John F. Anderson, M.D., George F. Leonard, M.D., and August Holm, Sc.D. ....	681

	Page
Antitoxins, Production of, by Means of Bacteriophage. N. W. Larkum, Ph.D.	1155
Apparatus for Study of the Bacterial Behavior of Air. W. F. Wells.	58
Application of the Principles of Water Purification to the Control of Swimming Pools. A. H. Fletcher and A. E. Clark.	407
Are the "Nerves" and Badness of Childhood of Any Importance to the Field of Public Health? Esther L. Richards, M.D.	198
Armstrong, Donald B., M.D., Sc.D. The Tuberculosis Movement Today.	663
Arner, George B. L., Ph.D. Statistics and the Health Officer.	28
Asbestosis, Pulmonary. J. Donnelly, M.D.	1275
Association News.....50, 143, 252, 353, 487, 609, 709, 834, 973, 1063, 1175,	1298
Additional Applicants for Fellowship.....841,	975
Affiliated State Public Health Societies.....Year Book,	27
American Public Health Association, The—Its Objectives and a Pledge of Their Attainment. ....Year Book,	5
Annual Meeting in 1934: Pasadena in 1934. Editorial.....	1296
Annual Meeting—Sixty-second Annual Meeting, A.P.H.A., Indianapolis, Ind. (headquarters, Claypool Hotel), October 9-12, 1933:	
Annual Meeting Information—mostly in August, 1933, issue.....	835
Did You Attend the Indianapolis Annual Meeting in 1900? (Memorial Session —at 62nd Annual Meeting, October 11—to Dr. Walter Reed and his associates on the Yellow Fever Commission).....	974
Editorials. The Sixty-Second Annual Meeting, Indianapolis, October 9-12. .607,	1168
Entertainment and Inspection Trips, Indianapolis.....	1063
Indianapolis, A.P.H.A. Convention City for 1933.....	481
Indianapolis Hotel Rates.....713,	839
Indianapolis Is Centrally Located (with map of Indiana and surrounding states).....	840
Indianapolis Local Committee.....	609
Indianapolis, Main Indiana Highways to—with road numbers and mileages indicated. ....	973
Indianapolis—Map of Downtown District, showing 23 hotels.....	838
Indianapolis Meeting, The. William F. King, M.D.....	834
Indianapolis, October 9-12: Some of the Places of Scientific Interest which Delegates to the Annual Meeting Will Visit.....	709
Preliminary Program of the Sixty-Second Annual Meeting, American Public Health Association, Indianapolis, Ind., October 9-12, 1933.....	949
Public Health Nursing at the Indianapolis A.P.H.A. Meeting.....	1326
Railroad Fares, Reduced.....	835
Railroad Mileage from Principal Cities in U. S. to Indianapolis.....	837
Railroad Rates from Various Centers to Indianapolis, Ind.....	836
Second Institute on Health Education (Indianapolis).....	1175
To Those Who Motor.....	837
Applicants for Fellowship.....715, 841,	975
Back Numbers of Journal Needed.....	1065
Bolt, Dr. Richard A., Receives Oberlaender Award.....	253
Closing Date for Submission of Fellowship Applications.....653,	893
Committee List, 1932-1933, of the American Public Health Association. Year Book,	16
Constitution and By-Laws, and Constitution for Sections, American Public Health Association. ....Year Book,	6
Did You Attend the Indianapolis Annual Meeting in 1900?.....	974
Editorial. Your Association.....	246
Emerson, Haven, M.D., President—Eugene Lindsay Bishop, M.D., President-Elect.	1298
Entertainment and Inspection Trips, Indianapolis.....	1063
Executive Office Staff of the American Public Health Association.....Year Book,	15
Fellowship Applications, Closing Date for Submission of.....653,	893
Gorham, Frederic Poole, 1871-1933.....	716
Hookworm Survey. ....	544
Important Notice for Members Wishing to Apply for Fellowship or Life Membership. ....	1176
Inter-Chamber Health Conservation Contest, Announcement of the 1933.....	712
Johnston, Dr. Wyatt—Laboratory Letters of Interest, from.....	1300
Laboratory Letters of Interest—from Dr. Wyatt Johnston.....	1300
Life Members and Honorary Fellow Elected at Indianapolis.....	1176
Lummis, Dr. G. D., Service of.....	51
Nation's Investment in Health, A—A.P.H.A. Radio Broadcasts.....	717
New Officers of the A.P.H.A. (1934).....	1175
Nomination for the Governing Council.....	842
Organizations Meeting with Us at Indianapolis.....	893
Park, William Hallock, M.D., Awarded Sedgwick Memorial Medal.....	50
Pickens, Earl Max.....	717
Preliminary Program of the Sixty-Second Annual Meeting, American Public Health Association, Indianapolis, Ind., October 9-12, 1933.....	949
Publications of the American Public Health Association.....Year Book,	15
Radio Broadcast.....	843
Radio Broadcasts of the A.P.H.A.—A Nation's Investment in Health.....	717
Referees of the American Public Health Association.....Year Book,	26

Association News—Continued	Page
Report of Executive Board of the Governing Council, American Public Health Association. E. L. Bishop, Chairman.....	Year Book, 29
Resolutions Adopted at the Fourth Annual Convention of the Western Branch, American Public Health Association, Pasadena, Calif., May 29-31.....	770
Resolutions, adopted by the Governing Council of the American Public Health Association October 26, 1932. Ira V. Hiscock, Chairman.....	Year Book, 37
Rural Health Appraisals.....	252
Second Institute on Health Education.....	1175
Section Councils of the American Public Health Association.....	Year Book, 14
Section Resolutions Adopted at the Indianapolis Annual Meeting—Vital Statistics.....	1299
Sedgwick Memorial Medal Awarded to William Hallock Park, M.D.....	50
Sixty-Third Annual Meeting Announcement.....	1175
Southern Branch, A.P.H.A., Organized.....	144
Vital Statistics Institute Proposed for 1934.....	715
Vital Statistics Section Resolutions Adopted at the Indianapolis Annual Meeting..	1299
Western Branch, American Public Health Association—Resolutions Adopted at the Fourth Annual Convention of the Western Branch—Pasadena, Calif., May 29-31.....	770
Your Association. Editorial.....	246
Australian and New Zealand Butters.....	205
Automatic Pipette Washer. Ellen Howell and Fannie Mae Frank.....	1186

## B

Bacillus Megatherium. Some Variants of. Georges Knaysi, Ph.D.....	260
Bacteria, isolation of intestinal. See The Bacteriology of the Intestinal Pathogens. Leon C. Havens, M.D.....	105
Bacterial Behavior of Air, Apparatus for Study of the. W. F. Wells.....	58
Bacterial Content of Frosted Hamburg Steak. Laurence P. Geer, William T. Murray and Ernest Smith.....	673
Bacterial Content of Milk by the Plate Method, A Yeast Extract Medium for Determining the. E. D. Devereux and J. L. Etchells.....	149
Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine, Study of—With Particular Reference to Swimming Pool Water. W. L. Mallmann, Ph.D., and William Cary, Jr.....	35
Bacteriology of the Intestinal Pathogens, The. Leon C. Havens, M.D.....	105
Bacteriophage, Production of Antitoxins by Means of. N. W. Larkum, Ph.D.....	1155
Badger, L. F., M.D. Laboratory Diagnosis of Endemic Typhus and Rocky Mountain Spotted Fever.....	19
Bang, Bernhard. Editorial.....	48
Barnes, L. A., Ph.D., and Kramer, S. D., M.D. A Test for Reaction-Producing Substances in Concentrated Antipneumococcic Serum—Preliminary Report.....	616
Bathing Places, Swimming Pools and. Report of the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers. W. J. Scott, Chairman.....	Year Book, 40
Bavaria, Textile Work and Normal Childbirth in.....	699
Baylis, J. R. Chairman. Taste and Odor Removal Processes. Report of the Committee on Water Supply.....	Year Book, 126
Beers, Analyses of Six New York. Walter H. Eddy, M.D.....	704
Beet Sugar Wastes, Purification of. Max Levine, Ph.D.....	585
Belgium, Effects of Unemployment on Children and Young People in. Report based upon findings of the Oeuvre Nationale de l'Enfance, Brussels. Richard A. Bolt, M.D., Dr.P.H., Oberlaender Award, Berlin, Germany.....	1091
Bellevue-Dr. P.H. Health Demonstration. See The Aim and Accomplishments of a Health Center Mental Hygiene Program. Elizabeth I. Adamson.....	211
Beverages, Health Aspects of Fruit. Walter H. Eddy, Ph.D.....	129
Bibliography, A Selected Public Health—With Annotations. Raymond S. Patterson, Ph.D., Associate Editor.....	93, 185, 299, 402, 538, 648, 766, 889, 1014, 1110, 1219, 1338
Bigelow, George H., M.D., D.P.H., and Anderson, Gaylord W., M.D. Diphtheria Immunization in Private Practice.....	655
Bigelow, George H., M.D., and Peemster, Roy F., M.D., Dr.P.H. Milk-Borne Disease in Massachusetts, 1930-1932.....	571
Birth Certificates. See Precaution When Filing Deferred Certificates. Stewart G. Thompson, D.P.H.....	567
Bishop, E. L., Chairman. Report of Executive Board to the Governing Council, American Public Health Association.....	Year Book, 29
Bishop, Eugene Lindsay, M.D., President-Elect—Haven, Emerson, M.D., President. Association News.....	1298
Blank, F. C., Ph.D., Chairman. The Vitamin Content of Cereals. Report of the Committee on Cereals and Their Products.....	Year Book, 54
Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man, A Study of the Opsono-Cytophagic Power of the. I. Forest Huddleson, Howard W. Johnson and E. B. Hamann.....	917
Blood Restoration, Significance of Copper and Iron in. C. A. Elvehjem, Ph.D.....	1285
Bolduan, Charles, M.D. Has Diabetes Become More Prevalent?.....	1282
Bolt, Dr. Richard A., Receives Oberlaender Award.....	253

	Page
Bolt, Richard Arthur, M.D., Dr.P.H., Associate Editor. See Child Hygiene Section.	
Bolt, Richard Arthur, M.D., Dr.P.H. Child Health and Child Welfare in England.....	1198
The Effects of Unemployment on Children and Young People in Germany.....	744
Maternal Mortality Study for Cleveland, Ohio.....	109
Books and Reports.....	84, 177, 289, 389, 529, 639, 757, 882, 1010, 1103, 1211, 1333
Abderhalden's Handbuch der Biologischen Arbeitsmethoden. Vol. XIII, Book 2, No. 8. Article 1, by Stravros Zurukzoglu. Article 2, by E. Friedberger and J. Weissfeiler. ....	1217
Adams, Carl W., D.D.S. Your Teeth and Their Care.....	392
Alcohol and Man. Edited by Haven Emerson, M.D.....	84
Aldrich, Charles Anderson, M.D. Cultivating the Child's Appetite (2d ed).....	393
Alexander, Prof. Dr. Hanns, and Alexander, Kurt. Die Arbeitsbehandlung zur Reform der Lungenheilstätten.....	181
Amateur Nurse. Mary Wright Wheeler, R.N.....	883
American Public Health Association, and the American Water Works Association, Published by the. Standard Methods for the Examination of Water and Sewage (7d ed.).....	645
Corrections. ....	1179
American Red Cross First Aid Text-Book.....	887
American Society of Municipal Engineers, Official Proceedings of the Thirty-Eighth Annual Convention of the.....	887
Andress, J. Mace, Ph.D., and Goldberger, I. H., M.D.: Broadcasting Health. ....	1013
The Health School on Wheels.....	1107
Annual Report of the Bureau of Sanitary Engineering, Maryland State Department of Health, 1932.....	885
Annual Report, The South African Institute for Medical Research, Year Ended December 31, 1932. Department of Industrial Hygiene, and Pathological Department. ....	1317
Applied Bacteriology. Thurman B. Rice, A.M., M.D.....	292
Approach to the Parent, The: A Study in Social Treatment. Esther Heath.....	1012
Bacteriology for Nurses (4th ed.). Mary Elizabeth Morse, A.B., M.D., and Martin Frobisher, Jr., S.B., Sc.D.....	291
Bacteriology for Nurses—With a Laboratory Manual. Royal M. Calder, M.D.....	292
Barber, Edith M. What Shall I Eat?.....	1214
Bartlett, Frederick H., M.D. Infants and Children: Their Feeding and Growth... ..	1108
Beale, John Foster, Suckling, Ernest Victor, and Tresh, John Clough, M.D. The Examination of Water and Water Supplies (4th ed.).....	884
Beck, James M., LL.D., Litt.D. Our Wonderland of Bureaucracy.....	400
Behind the Door of Delusion. "Inmate—Ward 8.".....	179
Benzol (Benzene) Poisoning: A New Investigation of the Toxicity of Benzene and Benzene Impurities (2d ed.). Carey P. McCord, with Nora Cox and Charlotte O'Boyle. ....	397
Bigelow, George H., and Lombard, H. L. Cancer and Other Chronic Diseases in Massachusetts. ....	1105
Blacklock, D. B., and Southwell, T. A Guide to Human Parasitology.....	178
Blacklock, John W. S. Tuberculous Disease in Children: Its Pathology and Bacteriology. ....	1103
Body Mechanics: Education and Practice. Report of the Subcommittee on Orthopedics and Body Mechanics. Robert B. Osgood, M.D., Chairman. Publication of the White House Conference on Child Health and Protection.....	90
Bolt, Richard A., M.D., Dr.P.H. Effects of Unemployment on Children and Young People in Belgium. Report based upon findings of the Oeuvre Nationale de l'Enfance, Brussels. ....	1091
Books for Tired Eyes (2d ed.). Compiled by Charlotte Matson.....	537
Bossard, James H. S., Ph.D., and Sellin, Thorsten, Ph.D., Edited by. Prohibition: A National Experiment.....	84
Broadcasting Health. J. Mace Andress, Ph.D., and I. H. Goldberger, M.D.....	1013
Brooks, Paul B., M.D., Compiled by. Twenty-First Annual Report of the International Association of Dairy and Milk Inspectors.....	757
Browning, C. H., with H. L. Coulthard, R. Cruickshank, K. J. Guthrie, and R. P. Smith. Chronic Enteric Carriers and Their Treatment. Special Report Series No. 179, Medical Research Council (London), 1933.....	640
Bundesen, Herman M., M.D., and Manry, Corrine. The Road to Health, Book I and Book II.....	1335
Bunzel, Bessie, and Dublin, Louis I., Ph.D. To Be or Not To Be: A Study of Suicide. ....	1336
Burnet, Dr. E. General Principles Governing the Prevention of Tuberculosis. Published by the League of Nations, Geneva, 1932.....	764
Calder, Royal M., M.D. Bacteriology for Nurses—With a Laboratory Manual.....	292
Campbell, Charles Macfie. Towards Mental Health: The Schizophrenic Problem.. ..	888
Canadian Mother's Book, The. Helen Macmurchy, M.D. Canadian Dept. of Pensions and National Health Publication No. 2.....	179



	Page
<b>Books and Reports—Continued</b>	
Cancer and Other Chronic Diseases in Massachusetts. George H. Bigelow and H. L. Lombard.....	1105
Cancer Then and Now. New York City Cancer Committee, 1932.....	525
Century of Public Health in Britain, 1832-1929, A. J. H. Harley Williams, M.D., Foreword by W. W. Jameson, M.D.....	177
Chang-Yao, Wu, and Lien-Teh, Wu, edited by. Reports, National Quarantine Service, China:	
Series II, 1931.....	393
Series III, 1932.....	1010
Chemistry of Tuberculosis, The (2d ed.). H. Gideon Wells and Esmond R. Long..	644
Child Care Today. Bela Schick, M.D., and William Rosenson, M.D.....	882
Child Labor: Report of the Subcommittee on Child Labor of the White House Conference on Child Health and Protection.....	90
Children's Sleep. Samuel Renshaw, Vernon L. Miller, and Dorothy P. Marquis....	1215
Chronic Enteric Carriers and Their Treatment. C. H. Browning, with H. L. Coulthard, R. Cruickshank, K. J. Guthrie, and R. P. Smith. Special Report Series No. 179, Medical Research Council (London), 1933.....	640
Clark, Evans. How to Budget Health.....	537
Clay, Henry H. The Sanitary Inspector's Handbook: A Manual for Sanitary Inspectors and Other Executive Public Health Officers.....	1106
Clifford, Randall, M.D. The Sputum—Its Examination and Clinical Significance..	180
Common Cold, The. David Thomson and Robert Thomson.....	1216
Community Health Organization. Edited by Ira V. Hiscock.....	389
Control of Football Injuries, The. Marvin A. Stevens, M.D., and Winthrop M. Phelps, M.D. ....	1212
Coombs, Carey F., and Short, A. Rendle, Edited by. The International Medical Annual.....	182
Correction of Defective Speech: A Complete Manual of Psycho-Physiological Technique for the Treatment and Correction of the Defects of Speech. E. B. Twitmeyer, Ph.D., and Y. S. Nathanson, Ph.D.....	532
Costs of Medical Care, Final Report of Committee on. Medical Care for the American People. ....	293
Cultivating the Child's Appetite (2d ed.). Charles Anderson Aldrich, M.D.....	393
Curative Value of Light, The. Edgar Mayer, M.D.....	298
 Daviau, Arthur R., M.D. Why We Do It—A Study of Normal, Subnormal, and Abnormal Human Behavior.....	759
Davies, George R., and Reinhardt, James M. Principles and Methods of Sociology.	89
Decade of District Health Center Pioneering, A: A 10-Year Report of the East Harlem Health Center.....	760
deKruif, Paul. Men Against Death.....	289
DeLee, Joseph B. Obstetrics for Nurses (10th ed.).....	1014
Development of Mental Health in a Group of Young Children, The: An analysis of factors in purposeful activity. Elizabeth Skelding Moore. University of Iowa Studies in Child Welfare, Vol. IV, No. 6, 1931.....	643
Diagnosis and Treatment of Postural Defects, The. Winthrop Morgan Phelps, M.D., and Robert J. H. Kiphuth.....	395
Dictionary for Nurses (2d ed.). Compiled by Lois Oakes.....	1214
Die Arbeitsbehandlung zur Reform der Lungenheilstätten. Prof. Dr. Hanns Alexander and Kurt Alexander.....	181
Die soziale Bedeutung und Beurteilung der Kreislauferkrankungen. Dr. Franz Grünbaum.....	885
Diehm, Margaret M., Ph.D., and Obold, Walter L., M.S. Manual of Microbiology..	395
Directory of Psychiatric Clinics in the United States. Compiled and edited by The National Committee for Mental Hygiene.....	757
Doll, Edgar A., Ph.D., Phelps, Winthrop M., M.D., and Melcher, Ruth Taylor. Mental Deficiency Due to Birth Injuries.....	86
Drinker, Katherine R., and Krogh, August. A Text-Book of Human Physiology for College Students.....	88
Dublin, Louis L., Ph.D., and Bunzel, Bessie. To Be or Not To Be: A Study of Suicide. ....	1336
 East Harlem Health Center, A 10-Year Report of the: A Decade of District Health Center Pioneering.....	760
Effects of Unemployment on Children and Young People in Belgium. Report based upon findings of the Oeuvre Nationale de l'Enfance, Brussels. Richard A. Bolt, M.D., D.P.H., Oberlaender Award, Berlin, Germany.....	1091
Emerson, Haven, M.D., Edited by. Alcohol and Man.....	84
Endocrine Medicine. William Engelbach, M.D. Foreword by Lewellys F. Barker.	534
Engelbach, William, M.D. Endocrine Medicine. Foreword by Lewellys F. Barker.	534
Environmental Factors in Negro Elementary Education. Clark Foreman.....	91
Epidemiology: Historical and Experimental. Major Greenwood, F.R.S.....	182
Ethics in Nursing. Gene Harrison.....	398
Everyday Problems in Health. Frank Merrill Wheat and Elizabeth T. Fitzpatrick.....	1107

## Books and Reports—Continued

	Page
Examination of Waters and Water Supplies, The (4th ed.). John Clough Tresh, M.D., John Foster Beale, and Ernest Victor Suckling.....	884
Expectant Mother's Handbook, The. Frederick C. Irving, M.D.....	292
Fads and Quackery in Healing. Morris Fishbein, M.D.....	295
Farm and Village Housing. Vol. VII, The President's Conference on Home Building and Home Ownership.....	646
Fetal, Newborn, and Maternal Morbidity and Mortality. Publication of the White House Conference on Child Health.....	1333
Findlay, Leonard, M.D. The Rheumatic Infection in Childhood.....	646
Fine Art of Living, The. Daniel S. Sager, M.D.....	531
First Aid Text-Book. American Red Cross.....	887
First Two Years, The: A Study of Twenty-Five Babies. Volume II, Intellectual Development. Mary M. Shirley.....	1217
Fishbein, Morris, M.D. Fads and Quackery in Healing.....	295
Fishbein, Morris, M.D. Frontiers of Medicine.....	1335
Fishberg, Maurice. Pulmonary Tuberculosis (4th ed.).....	88
Fitzpatrick, Elizabeth T., and Wheat, Frank Merrill. Everyday Problems in Health.....	1107
Ford, James, and Gries, John M., Edited by. Slums, Large-Scale Housing and Decentralization. Reports, The President's Conference on Home Building and Home Ownership.....	398
Foreman, Clark. Environmental Factors in Negro Elementary Education.....	91
Forman, Henry James. Our Movie Made Children.....	1333
Freeman, Allen W., M.D., edited by. A Study of Rural Public Health Services. By the Sub-Committee on Rural Public Health Work and the Committee on Administrative Practice of the American Public Health Association.....	1108
Friedberger, E., and Weissfeiler, J. Article 2. Abderhalden's Handbuch der Biologischen Arbeitsmethoden. Vol. XIII, Book 2, No. 8. Article 1, by Stravros Zurukzoglu.....	1217
Frobisher, Martin, Jr., S.B., Sc.D., and Morse, Mary Elizabeth, A.B., M.D. Bacteriology for Nurses (4th ed.).....	291
Frontiers of Medicine. Morris Fishbein, M.D.....	1335
Fundamentals of Personal Hygiene, The. Walter W. Kreuger.....	400
Fungous Diseases: A Clinico-Mycological Text. Harry P. Jacobson, M.D.....	641
Garland, Joseph, M.D. The Youngest of the Family: His Care and Training.....	290
General History of Nursing, A. Lucy Ridgely Seymer.....	761
General Principles Governing the Prevention of Tuberculosis. Dr. E. Burnet. Published by the League of Nations, Geneva, 1932.....	764
Goldberg, Benjamin. Procedures in Tuberculosis Control for the Dispensary, Home and Sanatorium. Chapter on Sanatorium Planning by Thomas B. Kidner, and Introduction by David J. Davis.....	1213
Goldberger, I. H., M.D., and Andress, J. Mace, Ph.D.: Broadcasting Health.....	1013
The Health School on Wheels.....	1107
Gray, William S., and Towse, Anna B. Health Stories, Book One.....	531
Greenwood, Major F. R. S. Epidemiology: Historical and Experimental.....	182
Gries, John M., and Ford, James, Edited by. Slums, Large-Scale Housing and Decentralization. Reports, The President's Conference on Home Building and Home Ownership.....	398
Grünbaum, Dr. Franz. Die soziale Bedeutung und Beurteilung der Kreislaufkrankungen.....	885
Guide to Human Parasitology, A. D. B. Blacklock and T. Southwell.....	178
Hahn, Mary L., and Winslow, C.-E. A. The New Healthy Living Series. Book I, The Game of Healthy Living; Book II, The Habits of Healthy Living; Book III, The Laws of Healthy Living; Book IV, The Healthy Community.....	643
Harrison, Gene. Ethics in Nursing.....	398
Health and Environment. Edgar Sydenstricker. Published under the direction of the President's Research Committee on Social Trends.....	1211
Health Education Activities. Kathleen Wilkinson Wooten.....	392
Health School on Wheels, The. J. Mace Andress, Ph.D., and I. H. Goldberger, M.D.	1107
Health Section Report of the Denver Meeting—World Federation of Education Associations. Published by the American Child Health Association and the Metropolitan Life Insurance Company, 1932.....	644
Health Stories, Book One. Anna B. Towse and William S. Gray.....	531
Heath, Esther. The Approach to the Parent: A Study in Social Treatment.....	1012
Herring, John W. Social Planning and Adult Education.....	1211
Hiscock, Ira V., Edited by. Community Health Organization.....	389
History and Epidemiology of Syphilis, The. William Allen Pusey, M.D.....	1105
History of Chinese Medicine. K. Chimin Wong and Wu Lien-Teh, M.A., M.D., Dr.M.Sc.....	296
History of Dermatology, The. William Allen Pusey, M.D.....	394
Hodgson, Violet H. Public Health Nursing in Industry.....	1336
Hookworm Infection. Clayton Lane, M.D.....	536

## Books and Reports—Continued

	Page
Hopkins, Edward S. Water Purification Control.....	645
Horwood, Murray P., Ph.D. The Sanitation of Water Supplies.....	289
Hoskins, R. S. The Tides of Life: The Endocrine Glands in Bodily Adjustment...	1218
Hospitals and Child Health. Publication of the White House Conference on Child Health and Protection.....	762
Housing and the Community—Home Repair and Remodeling. Reports, The President's Conference on Home Building and Home Ownership.....	391
Housing Objectives and Programs. The President's Conference on Home Building and Home Ownership.....	641
How to Budget Health. Evans Clark.....	537
Hutzel, Eleanore L., assisted by Madeline L. Macgregor. The Policewoman's Handbook.....	758
I Go Nursing. Corinne Johnson Kern.....	1334
Improvised Equipment in the Home Care of the Sick (2d ed.). Lyla M. Olson, R.N.	761
Industrial Psychology. Morris S. Viteles.....	87
Infants and Children: Their Feeding and Growth. Frederick H. Bartlett, M.D....	1108
International Association of Dairy and Milk Inspectors, Twenty-First Annual Report of the. Compiled by Paul B. Brooks, M.D.....	757
International Association of Milk Dealers, compiled by the. Laboratory Manual, Methods of Analysis of Milk and Its Product.....	761
International Committee for the Study of Infantile Paralysis, Survey by The. Poliomyelitis.....	523
International Health Year-Book, 1930, Vol. VI. Published by the League of Nations, Geneva, 1932.....	535
International Medical Annual, The. Edited by Carey F. Coombs and A. Rendle Short.....	182
Introduction to Practical Bacteriology, An (3rd ed.). T. J. Mackie and J. E. McCartney.....	91
Irving, Frederick C., M.D. The Expectant Mother's Handbook.....	292
Jackson, Josephine A., and Salisbury, Helen M. Outwitting Our Nerves (2d ed.)...	390
Jacobson, Harry P., M.D. Fungous Diseases: A Clinico-Mycological Text.....	641
Jensen, Deborah MacLurg, R.N., B.S. Student's Handbook on Nursing Case Studies (2d ed.).....	184
Kallet, Arthur, and Schlink, F. J. 100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics.....	530
Kenny, William R., Reed, Allen B., and LaMotte, Frank L. pH and Its Practical Applications: A New Handbook and Reference Work.....	291
Kern, Corinne Johnson. I Go Nursing.....	1334
Kiphuth, Robert J. H., and Phelps, Winthrop Morgan, M.D. The Diagnosis and Treatment of Postural Defects.....	395
Kirkpatrick, Edwin A. The Sciences of Man in the Making: An Orientation Book.....	391
Kline, B. S. Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis.....	532
Kreuger, Walter W. The Fundamentals of Personal Hygiene.....	400
Krogh, August, and Drinker, Katherine R. A Text-Book of Human Physiology for College Students.....	88
Laboratory Manual, Methods of Analysis of Milk and Its Products. Compiled by the International Association of Milk Dealers.....	761
LaMotte, Frank L., Kenny, William R., and Reed, Allen B. pH and Its Practical Applications: A New Handbook and Reference Work.....	291
Lane, Clayton, M.D. Hookworm Infection.....	536
Lien-Teh, Dr. Wu. Publications of the National Quarantine Service, Republic of China—Series I.....	293
Lien-Teh, Wu, and Chang-Yao, Wu, edited by. Reports, National Quarantine Service, China:	
Series II, 1931.....	393
Series III, 1932.....	1010
Lien-Teh, Wu, M.A., M.D., Dr.M.Sc., and Wong, K. Chimin. History of Chinese Medicine.....	296
Life Begins at Forty. Walter B. Pitkin.....	389
Lindray, Lillian. A Short History of Dentistry.....	1334
Logie, H. B., M.D., C.M., edited by. A Standard Classified Nomenclature of Disease, compiled by National Conference on Nomenclature of Disease.....	1104
Lohr, Lenox R. Magazine Publishing.....	184
Lombard, H. L., and Bigelow, George H. Cancer and Other Chronic Diseases in Massachusetts.....	1195
Long, Edmond R., and Wells, H. Gideon. The Chemistry of Tuberculosis (2d ed.).	644
Lusk, Graham. Nutrition.....	1214
Mackie, T. J., and McCartney, J. E. An Introduction to Practical Bacteriology (3rd ed.).	91

## Books and Reports—Continued

	Page
Macmurchy, Helen, M.D. The Canadian Mother's Book. Canadian Dept. of Pen- sions and National Health Publication No. 2.....	179
Magazine Publishing. Lenox R. Lohr.....	184
Manry, Corrine, and Bundesen, Herman M., M.D. The Road to Health, Book I and Book II.....	1335
Manual of Bacteriology and Pathology for Nurses (6th ed.). Jay G. Roberts.....	183
Manual of Microbiology. Walter L. Obold, M.S., and Margaret M. Diehm, Ph.D....	395
Marquis, Dorothy P., Renshaw, Samuel, and Miller, Vernon L. Children's Sleep...	1215
Maryland-Delaware Water and Sewerage Association, The. Proceedings Sixth Annual Conference, Cumberland, Md., 1932.....	92
Maryland, Report of the Water Resources Commission to the General Assembly of.....	529
Maryland State Department of Health. Annual Report (1932) of the Bureau of Sanitary Engineering.....	885
Matheson, Robert, Ph.D. Medical Entomology.....	183
Matson, Charlotte, compiled by. Books for Tired Eyes (2d ed.).....	537
Mayer, Edgar, M.D. The Curative Value of Light.....	298
McCartney, J. E., and Mackie, T. J. An Introduction to Practical Bacteriology (3rd ed.).....	91
McCord, Carey P., with Nora Cox and Charlotte O'Boyle. Benzol (Benzene) Poison- ing: A New Investigation of the Toxicity of Benzene and Benzene Impurities (2d ed.).....	397
McCormick, Olive. Water Pageants, Games and Stunts.....	1212
Medical Biology: A Laboratory Manual of Bacteriology, Mycology, Immunology and Parasitology—Consisting of Experimental Guide, Interpretive Text, Atlas and Protocol Form. William Barnard Sharp, M.D.....	1010
Medical Care for the American People. Final Report of Committee on Costs of Medical Care.....	293
Medical Entomology. Robert Matheson, Ph.D.....	183
Medical Research Council for the Year 1931-1932 (London), Report of the.....	529
Medical Secretary, The. Minnie Genevieve Morse.....	884
Medicine and the State: The Relation Between the Private and Official Practice of Medicine with Special Reference to Public Health. Sir Arthur Newsholme, K.C.B., M.D., F.R.C.P.....	86
Medicolegal Cases: Abstracts of Court Decisions of Medicolegal Interest. Edited by William C. Woodward, M.D., LL.M.....	178
Melcher, Ruth Taylor, Doll, Edgar A., Ph.D., and Phelps, Winthrop M., M.D. Mental Deficiency Due to Birth Injuries.....	86
Men Against Death. Paul de Krulff.....	289
Mental Deficiency Due to Birth Injuries. Edgar A. Doll, Ph.D., Winthrop M. Phelps, M.D., and Ruth Taylor Melcher.....	86
Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis. B. S. Kline.....	532
Milk, the Indispensable Food. James A. Tobey.....	1214
Miller, Vernon L., Marquis, Dorothy P., and Renshaw, Samuel. Children's Sleep...	1215
Miner, Leroy Matthew Simpson, D.M.D., M.D. The New Dentistry: A Phase of Preventive Medicine (Six Lowell Lectures).....	883
Moore, Elizabeth Skelding. The Development of Mental Health in a Group of Young Children: An analysis of factors in purposeful activity. University of Iowa Studies in Child Welfare, Vol. IV, No. 6, 1931.....	643
Morale—The Mental Hygiene of Unemployment. Dr. George K. Pratt.....	404
Morse, Mary Elizabeth, A.B., M.D., and Frobisher, Martin, Jr., S.B., Sc.D. Bacteri- ology for Nurses (4th ed.).....	291
Morse, Minnie Genevieve. The Medical Secretary.....	884
Nathanson, Y. S., Ph.D., and Twitmeyer, E. B., Ph.D. Correction of Defective Speech: A Complete Manual of Psycho-Physiological Technique for the Treat- ment and Correction of the Defects of Speech.....	532
National Conference on Nomenclature of Disease, compiled by. A Standard Classi- fied Nomenclature of Disease, edited by H. B. Logie, M.D., C.M.....	1104
Nervous and Mental Diseases for Nurses (2d ed.). Irving J. Sands.....	1012
New Dentistry, The: A Phase of Preventive Medicine (Six Lowell Lectures). Leroy Matthew Simpson Miner, D.M.D., M.D.....	883
New Healthy Living Series, The. Book I, The Game of Healthy Living; Book II, The Habits of Healthy Living; Book III, The Laws of Healthy Living; Book IV, The Healthy Community. C.-E. A. Winslow and Mary L. Hahn.....	643
New Jersey's Agricultural Experiment Station, 1880-1930. C. R. Woodward and E. N. Waller.....	399
New York City Cancer Committee, 1932. Cancer Then and Now.....	535
Newell, Frederick Haynes, edited by. Planning and Building the City of Wash- ington.....	647
Newman, Sir George, M.D. The Rise of Preventive Medicine.....	762
Newsholme, Sir Arthur, K.C.B., M.D., F.R.C.P. Medicine and the State: The Rela- tion Between the Private and Official Practice of Medicine with Special Refer- ence to Public Health.....	86
Normal Youth—And Its Everyday Problems. Douglas A. Thom, M.D.....	181

Books and Reports—Continued	Page
Nutrition. Graham Lusk.....	1214
Nutrition Service in the Field—Child Health Centers: A Survey. Report IC of the Committee on Medical Care for Children of the White House Conference on Child Health and Protection.....	523
Oakes, Lois, compiled by. Dictionary for Nurses (2d ed.).....	1214
Obermeyer, Henry. Stop That Smoke!.....	1013
Obold, Walter L., M.S., and Diehm, Margaret M., Ph.D. Manual of Microbiology... ..	395
Obstetrics for Nurses (10th ed.). Joseph B. DeLee.....	1014
Official Proceedings of the Thirty-Eighth Annual Convention of the American Society of Municipal Engineers.....	887
Olson, Lyla M., R.N. Improved Equipment in the Home Care of the Sick (2d ed.) ..	761
100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics. Arthur Kallet and F. J. Schlink.....	530
Osgood, Robert B., M.D., Chairman. Body Mechanics: Education and Practice. Report of the Subcommittee on Orthopedics and Body Mechanics. Publication of the White House Conference on Child Health and Protection.....	90
Our Movie Made Children. Henry James Forman.....	1333
Our Wonderland of Bureaucracy. James M. Beck, LL.D., Litt.D.....	400
Outwitting Our Nerves (2d ed.). Josephine A. Jackson and Helen M. Salisbury... ..	390
Peace of Mind and Body. William S. Walsh, M.D.....	882
Perkins, Francis Theodore, and Wheeler, Raymond Holder. Principles of Mental Development: A Textbook in Educational Psychology.....	399
pH and Its Practical Applications: A new Handbook and Reference Work. Frank L. LaMotte, William R. Kenny, and Allen B. Reed.....	291
Phelps, Winthrop Morgan, M.D., and Kiphuth, Robert J. H. The Diagnosis and Treatment of Postural Defects.....	395
Phelps, Winthrop M., M.D., Melcher, Ruth Taylor, and Doll, Edgar A., Ph.D. Mental Deficiency Due to Birth Injuries.....	86
Phelps, Winthrop M., M.D., and Stevens, Marvin A., M.D. The Control of Football Injuries.....	1212
Philadelphia College of Pharmacy and Science. Popular Science Talks.....	532
Phillips, Wendell C., M.D., and Rowell, Hugh Grant, M.D. Your Hearing: How to Preserve and Aid It.....	536
Pitkin, Walter B. Life Begins at Forty.....	389
Planning and Building the City of Washington. Edited by Frederick Haynes Newell.....	647
Policewoman's Handbook, The. Eleanore L. Hutzel, assisted by Madeline L. Macgregor.....	758
Poliomyelitis—Survey by The International Committee for the Study of Infantile Paralysis.....	533
Pomeroy, J. L., Compiled by. Public Health and the Private Medical Practitioner. Popular Science Talks. Philadelphia College of Pharmacy and Science.....	396
Post, Julia H., and Shirley, Mabel J. Selected Recreational Sports (for Girls and Women).....	532
Practical Medical Dictionary, A (12th ed.). Thomas Lathrop Stedman, A.M., M.D..	1216
Pratt, Dr. George K. Morale—The Mental Hygiene of Unemployment.....	1333
Principles and Methods of Sociology. James M. Reinhardt and George R. Davies..	404
Principles of Chemistry (3rd ed.). J. H. Roe.....	89
Principles of Mental Development: A Textbook in Educational Psychology. Raymond Holder Wheeler and Francis Theodore Perkins.....	85
Procedures in Tuberculosis Control for the Dispensary, Home and Sanatorium. Benjamin Goldberg. Chapter on Sanatorium Planning by Thomas B. Kidner, and Introduction by David J. Davis.....	399
Proceedings of Southern Branch of the American Public Health Association, Held at Birmingham, Alabama, November 14, 15, 16, 1932.....	1213
Proceedings Sixth Annual Conference, The Maryland-Delaware Water and Sewerage Association, Cumberland, Md., 1932.....	1213
Prohibition: A National Experiment. Edited by James H. S. Bossard, Ph.D., and Thorsten Sellin, Ph.D.....	92
Public Health and the Private Medical Practitioner. Compiled by J. L. Pomeroy, M.D.....	84
Public Health Nursing in Industry. Violet H. Hodgson.....	396
Publications of the National Quarantine Service, Republic of China—Series I. Dr. Wu Lien-Teh.....	1336
Pulmonary Tuberculosis (4th ed.). Maurice Fishberg.....	293
Purchase of Medical Care Through Fixed Periodic Payment, The. Pierce Williams	88
Pusey, William Allen, M.D.: The History and Epidemiology of Syphilis.....	180
The History of Dermatology.....	1105
Recent Social Trends in the United States. Report of the President's Research Committee on Social Trends in the United States, with a Foreword by Herbert Hoover.....	394
Reed, Allen B., LaMotte, Frank L., and Kenny, William R. pH and Its Practical Applications: A New Handbook and Reference Work.....	629
	291

## Books and Reports—Continued

	Page
Reinhardt, James M., and Davies, George R. Principles and Methods of Sociology.	89
Renshaw, Samuel, Miller, Vernon L., and Marquis, Dorothy P. Children's Sleep...	1215
Report of the Medical Research Council for the Year 1931-1932 (London).....	529
Report of the Water Resources Commission of Maryland to the General Assembly of Maryland. ....	529
Report on General Survey of the Problems of Sewage Treatment and Disposal in Willamette River Valley, Oregon.....	1335
Reports, National Quarantine Service—China. Edited by Wu Lien-Teh and Wu Chang-Yao:	
Series II, 1931.....	393
Series III, 1932.....	1010
Research on the Constitution of the Japanese with Special Reference to the Physiological Capacity. Dr. Yukinobu Yoshida.....	758
Rheumatic Infection in Childhood, The. Leonard Findlay, M.D.....	646
Rice, Thurman B., A.M., M.D. Applied Bacteriology.....	292
Rise of Preventive Medicine, The. Sir George Newman, M.D.....	762
Road to Health, The, Book I and Book II. Herman M. Bundesen, M. D., and Corrine Manry. ....	1335
Roberts, Jay G. Manual of Bacteriology and Pathology for Nurses (6th ed.)....	183
Robinson, Victor, M.D. Syllabus of Medical History.....	290
Roe, J. H. Principles of Chemistry (3rd ed.).....	85
Rose, Mary Swartz. Teaching Nutrition to Boys and Girls.....	298
Rosenson, William, M.D., and Schick, Bela, M.D. Child Care Today.....	882
Rowell, Hugh Grant, M.D., and Phillips, Wendell C., M.D. Your Hearing: How to Preserve and Aid It.....	536
Safety First for Little Folks. Lillian M. Waldo.....	1335
Sager, Daniel S., M.D. The Fine Art of Living.....	531
Salisbury, Helen M., and Jackson, Josephine A. Outwitting Our Nerves (2d ed.)..	390
Sands, Irving J. Nervous and Mental Diseases for Nurses (2d ed.).....	1012
Sanitary Inspector's Handbook, The: A Manual for Sanitary Inspectors and Other Executive Public Health Officers. Henry H. Clay.....	1106
Sanitation of Water Supplies, The. Murray P. Horwood, Ph.D.....	289
Schick, Bela, M.D., and Rosenson, William, M.D. Child Care Today.....	882
Schlink, F. J., and Kallet, Arthur. 100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics.....	530
Sciences of Man in the Making, The: An Orientation Book. Edwin A. Kirkpatrick. ....	391
Selected Recreational Sports (for Girls and Women). Julia H. Post and Mabel J. Shirley. ....	1216
Sellin, Thorsten, Ph.D., and Bossard, James H. S., Ph.D., Edited by. Prohibition: A National Experiment.....	84
Seymer, Lucy Ridgely. A General History of Nursing.....	761
Sharp, William Barnard, M.D. Medical Biology: A Laboratory Manual of Bacteriology, Mycology, Immunology and Parasitology—Consisting of Experimental Guide, Interpretive Text, Atlas and Protocol Form.....	1010
Shirley, Mabel J., and Post, Julia H. Selected Recreational Sports (for Girls and Women). ....	1216
Shirley, Mary M. The First Two Years: A Study of Twenty-Five Babies. Volume II, Intellectual Development.....	1217
Short, A. Rendle, and Coombs, Carey F., Edited by. The International Medical Annual.....	182
Short History of Dentistry, A. Lillian Lindsay.....	1334
Slums, Large-Scale Housing and Decentralization. Reports, The President's Conference on Home Building and Home Ownership. Edited by John M. Gries and James Ford.....	398
Snow, William F., Chairman. Social Hygiene in Schools. Report of the Subcommittee on Social Hygiene in Schools. Publication of the White House Conference on Child Health and Protection.....	389
Social Hygiene in Schools. Report of the Subcommittee on Social Hygiene in Schools. William F. Snow, Chairman. Publication of the White House Conference on Child Health and Protection.....	389
Social Planning and Adult Education. John W. Herring.....	1211
Social Work and Educational Problems in Germany, Series I. Dr. Ruth Weiland..	886
Southern Branch of the American Public Health Association, Proceedings of. Held at Birmingham, Alabama, November 14, 15, 16, 1932.....	1213
Southwell, T., and Blacklock, D. B. A Guide to Human Parasitology.....	178
Sputum, The—Its Examination and Clinical Significance. Randall Clifford, M.D..	180
Standard Classified Nomenclature of Disease, A. Compiled by the National Conference on Nomenclature of Disease, edited by H. B. Logie, M.D., C.M.....	1104
Standard Methods for the Examination of Water and Sewage (7th ed.). Published by the American Public Health Association and the American Water Works Association, 1933.....	645
Corrections. ....	1179
Stedman, Thomas Lathrop, A.M., M.D. A Practical Medical Dictionary (12th ed.)..	1333

## Books and Reports—Continued

Page

- Stevens, Marvin A., M.D., and Phelps, Winthrop M., M.D. *The Control of Football Injuries*. . . . . 1212
- Stocks, Herbert B. *Water Analysis for Sanitary and Technical Purposes* (2d ed., revised by W. Gordon Carey). . . . . 401
- Stop That Smoke! Henry Obermeyer. . . . . 1013
- Streptococci in Relation to Man in Health and Disease. Anna W. Williams, M.D.. 290
- Student's Handbook on Nursing Case Studies (2d ed.). Deborah MacLurg Jensen, R.N., B.S. . . . . 184
- Study of Rural Public Health Services, A. By the Sub-Committee on Rural Public Health Work and the Committee on Administrative Practice of the American Public Health Association, edited by Allen W. Freeman, M.D. . . . . 1108
- Suckling, Ernest Victor, Tresh, John Clough, M.D., and Beale, John Foster. *The Examination of Water and Water Supplies* (4th ed.). . . . . 884
- Sure, Barnett, Ph.D. *The Vitamins in Health and Disease*. . . . . 765
- Sydenstricker, Edgar. *Health and Environment*. Published under the direction of the President's Research Committee on Social Trends. . . . . 1211
- Syllabus of Medical History. Victor Robinson, M.D. . . . . 290
- Teaching Nutrition to Boys and Girls. Mary Swartz Rose. . . . . 298
- Text-Book of Human Physiology for College Students, A. August Krogh and Katherine R. Drinker. . . . . 88
- Thom, Douglas A., M.D. *Normal Youth—And Its Everyday Problems*. . . . . 181
- Thomson, David, and Thomson, Robert. *The Common Cold*. . . . . 1216
- Tides of Life, The: [The Endocrine Glands in Bodily Adjustment. R. S. Hoskins.. 1218
- To Be or Not To Be: A Study of Suicide. Louis I. Dublin, Ph.D., and Bessie Bunzel. . . . . 1236
- Tobey, James A. *Milk, the Indispensable Food*. . . . . 1214
- Towards Mental Health: [The Schizophrenic Problem. Charles Macfie Campbell.. 888
- Towse, Anna B., and Gray, William S. *Health Stories, Book One*. . . . . 531
- Tresh, John Clough, M.D., Beale, John Foster, and Suckling, Ernest Victor. *The Examination of Waters and Water Supplies* (4th ed.). . . . . 884
- Tuberculous Disease in Children: Its Pathology and Bacteriology. John W. S. Blacklock. . . . . 1103
- Twenty-First Annual Report of the International Association of Dairy and Milk Inspectors. Compiled by Paul E. Brooks, M.D. . . . . 757
- Twitmeyer, E. B., Ph.D., and Nathanson, Y. S., Ph.D. *Correction of Defective Speech: A Complete Manual of Psycho-Physiological Technique for the Treatment and Correction of the Defects of Speech*. . . . . 532
- Urling, Lewis H., D.D.S. *Your Teeth: Their Care and Preservation*. . . . . 401
- Vitamins in Health and Disease, The. Barnett Sure, Ph.D. . . . . 765
- Viteles, Morris S. *Industrial Psychology*. . . . . 87
- Waldo, Lillian M. *Safety First for Little Folks*. . . . . 1335
- Waller, E. N., and Woodward, C. R. *New Jersey's Agricultural Experiment Station, 1880-1939*. . . . . 399
- Walsh, William S., M.D. *Peace of Mind and Body*. . . . . 882
- Water Analysis for Sanitary and Technical Purposes (2d ed., revised by W. Gordon Carey). Herbert B. Stocks. . . . . 401
- Water Pageants, Games and Stunts. Olive McCormick. . . . . 1212
- Water Purification Control. Edward S. Hopkins. . . . . 645
- Welland, Dr. Ruth. *Social Work and Educational Problems in Germany, Series I*. 886
- Weissfeiler, J., and Friedberger, E. Article 2. *Abderhalden's Handbuch der Biologischen Arbeitsmethoden*. Vol. XIII, Book 2, No. 8. Article 1, by Stravros Zurukzoglu. . . . . 1217
- Wells, H. Gideon, and Long, Esmond R. *The Chemistry of Tuberculosis* (2d ed.). 644
- What Shall I Eat? Edith M. Barber. . . . . 1214
- Wheat, Frank Merrill, and Fitzpatrick, Elizabeth T. *Everyday Problems in Health*. . . . . 1107
- Wheeler, Mary Wright, R.N. *Amateur Nurse*. . . . . 883
- Wheeler, Raymond Holder, and Perkins, Francis Theodore. *Principles of Mental Development: A Textbook in Educational Psychology*. . . . . 399
- White House Conference on Child Health and Protection, publications of the:
- Body Mechanics*. . . . . 90
- Child Labor*. . . . . 90
- Fetal, Newborn, and Maternal Morbidity and Mortality*. . . . . 1333
- Hospitals and Child Health*. . . . . 762
- Nutrition Service in the Field*. . . . . 533
- Social Hygiene in Schools*. . . . . 389
- Why We Do It—A Study of Normal, Subnormal, and Abnormal Human Behavior. Arthur R. Daviau, M.D. . . . . 759
- Willamette River Valley, Oregon—Report on General Survey of the Problems of Sewage Treatment and Disposal in. . . . . 1235
- Williams, Anna W., M.D. *Streptococci in Relation to Man in Health and Disease*. 290
- Williams, J. H. Harley, M.D., Foreword by W. W. Jameson, M.D. *A Century of Public Health in Britain, 1832-1929*. . . . . 177

## Books and Reports—Continued

	Page
Williams, Pierce. The Purchase of Medical Care Through Fixed Periodic Payment. . . . .	180
Winslow, C.-E. A., and Hahn, Mary L. The New Healthy Living Series. Book I, The Game of Healthy Living; Book II, The Habits of Healthy Living; Book III, The Laws of Healthy Living; Book IV, The Healthy Community. . . . .	643
Wong, K. Chimin, and Lien-Teh, Wu, M.A., M.D., Dr.M.Sc. History of Chinese Medicine. . . . .	296
Woodward, C. R., and Waller, E. N. New Jersey's Agricultural Experiment Station, 1880-1930. . . . .	399
Woodward, William C., M.D., LL.M., Edited by. Medicolegal Cases: Abstracts of Court Decisions of Medicolegal Interest. . . . .	178
Wooten, Kathleen Wilkinson. Health Education Activities. . . . .	392
Yoshida, Dr. Yukinobu. Research on the Constitution of the Japanese with Special Reference to the Physical Capacity. . . . .	758
Youngest of the Family, The: His Care and Training. Joseph Garland, M.D. . . . .	290
Your Hearing: How to Preserve and Aid It. Wendell C. Phillips, M.D., and Hugh Grant Rowell, M.D. . . . .	536
Your Teeth: Their Care and Preservation. Lewis H. Urling, D.D.S. . . . .	401
Your Teeth and Their Care. Carl W. Adams, D.D.S. . . . .	392
Zurukzoglu, Stravros. Article 1. Abderhalden's Handbuch der Biologischen Arbeitsmethoden. Vol. XIII, Book 2, No. 8. Article 2, by E. Friedberger and J. Weissfeiler. . . . .	1217
Bovine Origin, Tuberculosis of. Mazýck P. Ravenel, M.D. . . . .	316
Bovine Tuberculosis. . . . .	113
B. Pertussis Agglutination, Rapid Agglutination Technic Applied to. Pearl L. Kendrick, Sc.D. . . . .	1310
Bredeck, Joseph F., D.P.H. The Story of the Epidemic of Encephalitis in St. Louis. . . . .	1135
Breed, Robert S., Ph.D. Proposed Changes in the New (Sixth) Edition of the Standard Methods of Milk Analysis. Report of the Committee on Standard Methods of Milk Analysis. . . . .	359
Bricker, Elizabeth B., M.D., Chairman. Report of the Committee on Volatile Solvents. . . . .	138
Year Book, . . . . .	721
Brom-Thymol-Blue Reaction in Freshly Drawn Milk, A Study of the. C. S. Bryan. . . . .	1165
Brooks, Paul B., M.D. "Missed" Epidemics of Septic Sore Throat. . . . .	917
Brucella Infection and Immunity in Man, A Study of the Opsono-Cytophagic Power of the Blood and Allergic Skin Reaction in. I. Forest Huddleson, Howard W. Johnson and E. E. Hamann. . . . .	917
Bryan, C. S.: . . . . .	1182
Preservation of Milk Samples with Brilliant Green for Abortus and Streptococcus. . . . .	721
A Study of the Brom-Thymol-Blue Reaction in Freshly Drawn Milk. . . . .	716
Bunker, John W. M. Frederic Poole Gorham, 1871-1933. . . . .	591
Bureau of Tuberculosis in a City Department of Health, Administration of a. H. R. Edwards, M.D. . . . .	343
Butterfield, C. T. Suggested Procedures for the Presumptive Test in the Determination of the Coli-Aerogenes Group. . . . .	205
Butters, Australian and New Zealand. . . . .	

## C

Caldwell, Elfreda L., and Parr, Leland W., Ph.D. Present Status of Handling Water Samples: Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions With Special Reference to the Direct Method. . . . .	467
Carbon Tetrachloride Intoxication, Toxic Amblyopia and Accompanying Physiological Disturbances in. Zolton T. Wirtschafter, M.D. . . . .	1035
Cary, Helen A., M.D., and Levin, William, Dr.P.H. Antigenic Value of Commercial Diphtheria Toxoids. . . . .	1067
Cary, William, Jr., and Mallmann, W. L., Ph.D. Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine, With Particular Reference to Swimming Pool Water. . . . .	35
Cereals, The Vitamin Content of. Report of the Committee on Cereals and Their Products. F. C. Blanck, Ph.D., Chairman. . . . .	54
Certificates, Precaution When Filing Deferred. Stewart G. Thompson, D.P.H. . . . .	567
Changes in the New (Sixth) Edition of the Standard Methods of Milk Analyses, Proposed. Report of the Committee on Standard Methods of Milk Analysis. Robert S. Breed, Ph.D. . . . .	359
Chicago, Amebic Dysentery in. Editorial. . . . .	1294
Childbirth Benefits in the New Social Insurance Law, Rumania. . . . .	1236
Child Health and Child Welfare in England. Richard Arthur Bolt, M.D., Dr.P.H. . . . .	1198
Child Health in Mining Camp and Village (Harlan County, Ky.). Iva M. Miller. . . . .	517
Child Health Programs in Ontario by Survey Methods, Effectiveness of. John T. Phair, M.B., D.P.H. . . . .	1
Child Hygiene Section. Richard A. Bolt, M.D., Dr.P.H., Associate Editor. . . . .	72, 166, 278, 377, 516, 744, 858, 997, 1091, 1198, 1324



	Page
Child Hygiene and Parental Education.....	278
Child Labor and Child Health.....	72
Child Labor Law of May 3, 1933, Egypt.....	1289
Child, Mental Health of the Preschool. Ira S. Wile, M.D.....	191
Childhood of Any Importance to the Field of Public Health, Are the "Nerves" and Badness of? Esther L. Richards, M.D.....	198
Childhood, Tuberculosis of, Recognition and Control of. Eugene L. Opie, M.D.....	305
Children and Young People in Germany, The Effects of Unemployment on. Richard A. Bolt, M.D., Dr.P.H.....	744
Children, Early Diagnosis of Tuberculosis Among. Elton G. Littell, M.D.....	145
Children, Relation of the Use of Milk to the Physical and Scholastic Progress of Undernourished School. Fred F. Lininger, Ph.D.....	555
Children's Sleep, Report of an Experiment Determining the Effect of Weather on. Eunice Pierce.....	860
Children's Weight During Economic Disturbances.....	1223
Childs, L. W., M.D. The Tuberculin Skin Test from the School Physician's Standpoint.	997
Chloramines for the Disinfection of Swimming Pools, Some Factors Involved in the Use of. A. H. Fletcher and E. C. Link.....	1255
Chlorination, The Oxidation Potential Concept of. F. C. Schmelkes.....	269
Chlorine, Study of Bacteriological Methods of Testing and Means of Disinfecting Water with, With Particular Reference to Swimming Pool Water. W. L. Mall- mann, Ph.D., and William Cary, Jr.....	35
Cities, Effects of Air Contaminants on the Natural Light of. H. B. Meller and Mary E. Warga.....	217
Cities, Loss of Actinic Sunshine as a Health Problem of. Fred O. Tonney, M.D.....	775
Clark, A. E., and Fletcher, A. H. Application of the Principles of Water Purification to the Control of Swimming Pools.....	497
Clark, M. E., and Gilbert, Ruth, M.D. The Use of Glycerol as a Preservative for Milk Specimens to Be Examined for Hemolytic Streptococci.....	720
Classes for Expectant Fathers. Eldred V. Thiehoff, M.D.....	1200
Classification of Public Health Degrees Granted in 1933; and College Enrollment in Public Health. Committee on Professional Education—W. S. Leathers, M.D., Chairman.....	1124
See also Report by C. E. Turner, Chairman.....	Year Book, 120
Cleanliness Institute. Letter to the Editor from W. W. Peter, M.D., Dr.P.H.....	53
Cleveland Child Health Association, Report of the Preschool Center Program of the. E. V. Thiehoff, M.D.....	858
Cleveland, Ohio, Maternal Mortality Study for. Richard A. Bolt, M.D., Dr.P.H.....	109
Cohn, Morris M., M.Sc. in C.E. Smoke Abatement at Low Cost (in Schenectady, N. Y.).	668
Coleman, Marlon B., and Gilbert, Ruth, M.D. Agglutination in the Diagnosis of Enteric Disease.....	693
Coll-Aerogenes Group, Suggested Procedures for the Presumptive Test in the Deter- mination of the. C. T. Butterfield.....	343
College Enrollment in Public Health, and Classification of Public Health Degrees Granted in 1933. Committee on Professional Education—W. S. Leathers, M.D., Chairman.....	1124
See also Report by C. E. Turner, Chairman.....	Year Book, 120
Commercial Diphtheria Toxoids, Antigene Value of. William Levin, Dr.P.H., and Helen A. Cary, M.D.....	1067
Committee List, 1932-1933, of the American Public Health Association.....	Year Book, 16
Committee on:	
Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers, Report of the. Swimming Pools and Bathing Places. W. J. Scott, Chairman.....	Year Book, 40
Business Management, Report of the. Housing of Health Departments. George C. Ruhland, M.D., Chairman.....	Year Book, 50
Cereals and Their Products, Report of the. The Vitamin Content of Cereals. F. C. Blank, Ph.D., Chairman.....	Year Book, 54
Fellowship and Membership of the Public Health Engineering Section, Report of the. L. H. Enslow, Chairman.....	65, 1316
Fish and Shellfish, Report of the. The Need for Improved Sanitation in the Sea- foods Industries. A. C. Hunter, Ph.D., Chairman.....	Year Book, 58
Forms and Methods of Statistical Practice, Report of the. How Are Vital Statis- tics Being Used and by Whom. A. W. Hedrich, Sc.D., Chairman.....	Year Book, 62
Forms and Methods of Statistical Practice, Report of the. Occupational Mortality Statistics. A. W. Hedrich, Sc.D., Chairman.....	Year Book, 68
Fruits and Vegetables, Report of the. Walter H. Eddy, Ph.D., Chairman.....	Year Book, 71
Industrial Fatigue, Report of the. Frederick B. Flinn, Chairman.....	Year Book, 74
Industrial Plant Sanitation, Report of the. F. G. Legg, Jr., Chairman.....	Year Book, 79
Milk and Dairy Products, Report of the. W. B. Palmer, Chairman.....	Year Book, 82
Milk Supply of A.P.H.A. and the Committee on Milk Sanitation of the Conference of State Sanitary Engineers, Progress Report of the. C. A. Holmquist, Chair- man.....	Year Book, 88

## Committee on—Continued

	Page
Noise, Progress Report of the. Hygeia Harkens to Noise. C. R. Cox, Chairman..	
Year Book,	92
Nutritional Problems, Report of the. Vitamin C. H. C. Sherman, Chairman.....	
Year Book,	97
Pneumoconiosis and the Committee on Standard Practices in Compensation of Occupational Diseases, Report (Joint) of the. Pneumoconiosis. R. R. Sayers, M.D., Chairman. ....	100
Professional Education. College Enrollment in Public Health; and Classification of Public Health Degrees Granted in 1933. W. S. Leathers, M.D., Chairman...	1124
Promotion of Environmental Sanitation, Report of the. V. M. Ehlers, Chairman..	
Year Book,	103
Proper Allocation of Records, Report of the. J. V. DePorte, Ph.D., Chairman.....	
Year Book,	107
Public Health Engineering Manual, Report of the. Abstract. A. E. Gorman, Chairman. ....	63
Record Forms, Report of the. Public Health Engineering Functions of City Health Departments. I. W. Mendelsohn, Chairman.....	108
Registration Affairs, Report of the. T. F. Murphy, M.D., Chairman....	115
Rural Sanitation of A.P.H.A. and the Conference of State Sanitary Engineers, in coöperation with a committee of the Society of Agricultural Engineers—Report of the. Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. H. B. Hommon, Chairman.....	116
Scope and Policy, Report of the. Paul Hansen, Chairman.....	1315
Sewage Disposal, Report of the. Abstract. Langdon Pearse, Chairman.....	64
Standard Methods of Milk Analysis, Report of. Proposed Changes in the New (Sixth) Edition of the Standard Methods of Milk Analysis. Robert S. Breed, Ph.D. ....	359
Standard Methods of the Laboratory Section, Abstract of Report of the Referee on the Standardization of the Complement-Fixation Test for Syphilis—presented to. Ruth Gilbert, M.D., Referee.....	499
Standard Methods, Report of the Referee on Oyster Analysis—presented to. Frederic P. Gorham, Referee.....	56
Training and Personnel, Report of the. C. E. Turner, Chairman.....	120
Ventilation and Atmospheric Pollution, Report of the. Emery R. Hayhurst, M.D., Chairman. ....	134
Year Book,	138
Volatile Solvents, Report of the. Elizabeth B. Bricker, M.D., Chairman.....	
Year Book,	138
Water Supply. Report of the. Taste and Odor Removal Processes. J. R. Baylis, Chairman. ....	126
Year Book,	478
Common Sense in Health Propaganda. Editorial.....	1055
Community Health Organization, Letter to the Editor on. G. M. Mackenzie, M.D.....	
Complement-Fixation Test for Syphilis, Abstract of Report of the Referee on the Standardization of the—presented to the Committee on Standard Methods of the Laboratory Section. Ruth Gilbert, M.D., Referee.....	499
Computing and Standardizing the Maternal Mortality Rate, Suggested Method of. Robert J. Lowrie, M.D.....	459
Conference of State Sanitary Engineers and A.P.H.A.—Report of the Joint Committee on:	
Bathing Places. Swimming Pools and Bathing Places. W. J. Scott, Chairman....	
Year Book,	40
Milk Supply. Progress Report. C. A. Holmquist, Chairman.....	88
Rural Sanitation—in coöperation with a committee of the Society of Agricultural Engineers. Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. H. B. Hommon, Chairman.....	116
Year Book,	1340
Conferences.....96, 190, 303, 406, 546, 654, 772, 894, 1017, 1114, 1222,	707
Conservation of Water. Editorial.....	
Constitution and By-Laws, and Constitution for Sections, American Public Health Association. ....	6
Year Book,	851
Convenient Feces Specimen Container, A. M. Frobisher, Jr.....	1285
Copper and Iron in Blood Restoration, Significance of. C. A. Elvehjem, Ph.D.....	662
Costa Rica, Children's Code in.....	450
Costs of Medical Care. See Industry in Medicine. C.-E. A. Winslow, Dr.P.H.....	139
See Only Three Cents for Health. Editorial.....	
Cox, C. R., Chairman. Hygeia Harkens to Noise. Progress Report of the Committee on Noise. ....	92
Year Book,	13
Cranberries, Nutritive Value of. Carl R. Fellers, Ph.D.....	433
Craster, Charles V., M.D. Medical Examination of Domestic Servants.....	
Cuba, Eradication of Yellow Fever in. The Work of Walter Reed and His Associates of the Medical Department of the United States Army. Major General Robert U. Patterson. ....	1127
Culture Tests in the Diagnosis of Diphtheria, Value of. Hazel M. Hatfield, M.D., and Alice G. Mann.....	847
Current Preoccupations of Health Officers. Huntington Williams, M.D., Dr.P.H.....	323
Current Work of the Section on Epidemiology. Haven Emerson, M.D.....	341

	Page
Deaths.....190, 229, 303, 545, 716, 717, 1222	122
Deaths from Silicosis in Great Britain.....	122
Death Notices:	
Alexander, Magnus W., New York, N. Y.....	1065
Bang, Dr. Bernhard, Copenhagen, Denmark. Editorial.....	48
Beacham, W. D., M.D., Hattiesburg, Miss.....	144
Brannock, Albert L., M.D., Pontiac, Mich.....	487
Butler, Margaret M., Chicago, Ill.....	487
Cantor, Dr. Louis, Jerusalem, Palestine.....190,	487
Carey, John W., Barnhardt, Mo.....	1065
Cermak, Anton J., Chicago, Ill.....	487
Clark, Lydia, Columbus, Ohio.....	714
Cooper, Dr. Calvin L., Kansas City, Mo.....96,	1065
Coote, H. L. B., M.D., Michigan City, Ind.....	714
Cope, Dr. James Hallam, Pleasanton, Calif.....	406
Corney, Dr. Robert B., Little Rock, Ark.....	406
Cotton, William C., Atwater, Calif.....	714
Crooks, A. A., M.D., Peoria, Ill.....	487
Dewey, Dr. Martin.....	653
Evans, Edith Vivian, New York, N. Y.....	96
Ferreira, Gideon J., M.D., Duluth, Minn.....	1065
Gorham, Frederic Poole, Providence, R. I.....716,	1065
Grandy, Charles R., M.D., Norfolk, Va.....	487
Hallett, G. Webster, Osterville, Mass.....	714
Hamann, Paul, East Moline, Ill.....	302
Havens, Leon C., M.D., Montgomery, Ala.....546,	714
Hill, Professor A. Bostock, Warwick, England.....	142
Horner, J. S., M.D., W. Pawlet, Vt.....	1065
Hosteller, Menno, M.D., Wichita, Kans.....	144
Iglick, Samuel, M.D., Orland, Calif.....	144
Knowles, Morris, Pittsburgh, Pa.....	144
Kopf, Edwin W., New York, N. Y.....	1113
Lake, Emma S., Greensburg, Pa.....	144
Lanpher, Howard A., M.D., Des Moines, Ia.....	487
LeBien, Dr. Ernest A., McHenry, N. D.....	714
Malts, Charles Buckley, M.D., Pittsburgh, Pa.....303, 487,	545
Mattison, F. C. E., M.D., Pasadena, Calif.....	714
Mayer, Dr. Frederick W., Indianapolis, Ind.....	893
McClintock, James R., B.S., New York, N. Y.....546,	714
McElroy, Sylvan, M.D., Orlando, Fla.....	487
Miller, C. Wilson, Columbia, S. C.....	1065
Monger, John E., M.D., Columbus, Ohio.....	144
Pickens, Earl Max, D.V.M., College Park, Md.....717,	1065
Probst, Dr. Charles O., Columbus, Ohio.....	545
Read, Harry K., M.D., Houston, Tex.....303,	487
Shore, Clarence A., M.D., Raleigh, N. C.....487, 545,	772
Skinner, J. O., M.D., Washington, D. C.....	1065
Slack, Francis H., M.D., Coolidge Corner, Mass.....	1065
Smith, J. Waldo, New York, N. Y.....	1222
Vallery-Radot, René, Paris, France.....	546
Wachter, Leonard M., Albany, N. Y.....229,	487
Walker, Agnes, M.D., Bolinas, Calif.....	1065
Williams, Irving D., M.D., New York, N. Y.....	714
Wilson, Gordon, M.D., Baltimore, Md.....	1065
Wiltse, James W., M.D., Albany, N. Y.....	1065
Decker, Charles W., M.D. The Relationship of Public Health to the Doctor in Private Practice.....	821
Deep Water Sampling Rod, A. Louva G. Lenert.....	856
Defeat of Pasteurization in Manchester, England. Editorial.....	479
Dengue. See Health Problems Peculiar to the Southern States. John A. Ferrell, M.D.....	441
Denmark, Maternity Leave in.....	24
Dental Problem, A New Ramification of the. John Oppie McCall, D.D.S.....	1324
DePote, J. V., Ph.D., Chairman. Report of the Committee on Proper Allocation of Records.....Year Book,	107
Depression and Health Appropriations, The. Editorial.....	1290
Depression and Health in England. Editorial.....	1170
Depression and Health, The. Editorials.....247,	943
Dermatitis in the United States, Industrial. Louis Schwartz, M.D.....	1049
Determination of the Coll-Aerogenes Group. Suggested Procedures for the Presumptive Test in the. C. T. Butterfield.....	343
Devereux, E. D., and Etchells, J. L. A Yeast Extract Medium for Determining the Bacterial Content of Milk by the Plate Method.....	149
Diabetes Become More Prevalent, Has? Charles Bolduan, M.D.....	1282
Diagnosis and Serum Therapy of Pneumococcus Pneumonia, Laboratory Aids in the. Albert E. Sabin, M.D.....	978

	Page
Diagnosis of Diphtheria, Value of Culture Tests in the. Hazel M. Hatfield, M.D., and Alice G. Mann.....	847
Diagnosis of Endemic Typhus and Rocky Mountain Spotted Fever, Laboratory. L. F. Badger, M.D. ....	19
Diagnosis of Enteric Disease, Agglutination in the. Ruth Gilbert, M.D., and Marion B. Coleman. ....	693
Diagnosis of Tuberculosis Among Children. Early. Elton G. Littell, M.D.....	145
Differentiation of Human from Bovine Tubercle Bacilli. Editorial.....	706
Diphtheria. See Letter to the Editor.....	948
See Obstacles in the No-Diphtheria Path. W. P. Shepard, M.D.....	547
Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer, Non-specific Flocculation of. John F. Anderson, M.D., George F. Leonard, M.D., and August Holm, Sc.D.....	681
Diphtheria Immunization in Private Practice. Gaylord W. Anderson, M.D., and George H. Bigelow, M.D., D.P.H.....	655
Diphtheria Immunization Records, Practical Uses of. Edward S. Godfrey, Jr., M.D....	809
Diphtheria Toxoids, Antigenic Value of Commercial. William Levin, Dr.P.H., and Helen A. Cary, M.D.....	1067
Diphtheria, Value of Culture Tests in the Diagnosis of. Hazel M. Hatfield, M.D., and Alice G. Mann.....	847
Disinfecting Water with Chlorine, Study of Bacteriological Methods of Testing and Means of—With Particular Reference to Swimming Pool Water. W. L. Mallmann, Ph.D., and William Cary, Jr.....	35
Disinfection of Swimming Pools, Some Factors Involved in the Use of Chloramines for the. A. H. Fletcher and E. C. Link.....	1255
Doctor and His Business, The.....	676
Doctor in Private Practice, The Relationship of Public Health to the. Charles W. Decker, M.D. ....	824
Does Heating Injure the Nutritive Properties of Milk? Editorial.....	476
Domestic Servants, Medical Examination of. Charles V. Craster, M.D., D.P.H.....	433
Donnelly, J., M.D. Pulmonary Asbestosis.....	1275
Dublin, Louis I., Ph.D., Associate Editor. See Vital Statistics Section.	

## E

Early Diagnosis of Tuberculosis Among Children. Elton G. Littell, M.D.....	145
Eating Utensils as a Source of Infection. Editorial.....	606
Eddy, Walter H., Ph.D., Chairman. Report of the Committee on Fruits and Vegetables.....	71
Eddy, Walter H., Ph.D.: Analyses of Six New York Beers.....	704
Health Aspects of Fruit Beverages.....	129
Editorials:	
Air Conditioning and Ventilation.....	603
Amebic Dysentery in Chicago.....	1294
Annual Meeting in 1934. See Pasadena in 1934.....	1296
Bang, Bernhard.....	48
Common Sense in Health Propaganda.....	478
Conservation of Water.....	707
Defeat of Pasteurization in Manchester, England.....	479
Depression and Health in England.....	1170
Depression and Health, The.....	247, 943
Differentiation of Human from Bovine Tubercle Bacilli.....	706
Does Heating Injure the Nutritive Properties of Milk?.....	476
Eating Utensils as a Source of Infection.....	606
Encephalitis in St. Louis.....	1058
England, Depression and Health in.....	1170
Epidemiology and Air Travel.....	828
Health Officers' World, The—A New Journal.....	352
Indianapolis Meeting, The.....	826
Malarial Fever.....	944
Milk and Meat Inspection in the United States.....	604
Mottled Enamel.....	47
New Journal, A—The Health Officers' World.....	352
Nonspecific Immunity by Heterologous Vaccination.....	946
Only Three Cents for Health.....	139
Park, Doctor, Not to Retire.....	1293
Pasadena in 1934.....	1296
Porter, Charles, M.D.....	827
Prevention of Rickets.....	45
Radium Poisoning.....	350
Rickets, Prevention of.....	45
Senate Bill No. 1944.....	1295
See Proposed Federal Food and Drugs Act, Its Public Health Features. Walter S. Frisbie.....	1232
Sixty-Second Annual Meeting, The—Indianapolis, October 9-12.....	607

	Page
<b>Editorials—Continued</b>	
Sixty-Second Annual Meeting. The.....	1168
Smallpox, Vaccination Against—Or Not?.....	351
Triumph for Public Health, A.....	705
Tubercle Bacilli, Differentiation of Human from Bovine.....	706
Tubercle Bacilli from the Blood Stream.....	1171
Use Your Public Health Degrees.....	138
Vaccination Against Smallpox—Or Not?.....	351
Vitamin D Milk and the Health Officer.....	1069
Western Branch Meeting, The.....	708
Your Association.....	246
<b>Education and Publicity Section.</b> Evart G. Routzahn, Associate Editor....78, 172, 285, 381, 523, 634, 751, 875, 1002, 1095, 1204,	1329
<b>Education, Health.</b> Iago Galdston, M.D.....	337
<b>Education, Motivation in Health.</b> Benjamin C. Gruenberg.....	114
<b>Education, The Psychology of Public.</b> Edward S. Robinson.....	123
<b>Edwards, H. R., M.D.</b> Administration of a Bureau of Tuberculosis in a City Depart- ment of Health.....	591-
<b>Effectiveness of Child Health Programs in Ontario by Survey Methods.</b> John T. Phair, M.B., D.P.H.....	1
<b>Effects of Air Contaminants on the Natural Light of Cities.</b> H. B. Meller and Mary E. Warga.....	217
<b>Effects of Unemployment on Children and Young People in Belgium.</b> Report based upon findings of the Oeuvre Nationale de l'Enfance, Brussels. Richard A. Bolt, M.D., Dr.P.H., Oberlaender Award, Berlin, Germany.....	1091
<b>Effects of Unemployment on Children and Young People in Germany, The.</b> Richard A. Bolt, M.D., Dr.P.H.....	744
<b>Egypt—Child Labor Law of May 3, 1933.</b> .....	1289
<b>Ehlers, V. M., Chairman.</b> Report of the Committee on Promotion of Environmental Sanitation.....Year Book,	103
<b>Electric Circuits, Injuries Produced by Contact with.</b> .....	425
<b>Elmsford, N. Y., Outbreak of Erythema Infectiosum in.</b> Phyllis Schuyler Kerr, M.D., and Edward H. Marsh, M.D., Dr.P.H.....	1271
<b>Elvehjem, C. A., Ph.D.</b> Significance of Copper and Iron in Blood Restoration.....	1285
<b>Emerson, Haven, M.D.:</b> Current Work of the Section on Epidemiology.....	341
Sunlight and Health.....	437
<b>Emerson, Haven, M.D., President—Eugene Lindsay Bishop, M.D., President-Elect.</b> Association News.....	1298
<b>Employee Effectiveness, Text Room Studies in (Western Electric Company).</b> C. E. Turner, Dr.P.H.....	577
<b>Enamel, Mottled.</b> Editorial.....	47
<b>Encephalitis:</b> Discussion (in Epidemic Encephalitis Symposium) by Theodore C. Hempelmann, M.D.; Howard Anderson McCordock, M.D.; Ralph S. Muckenfuss, M.D.; and Thomas M. Rivers, M.D.....	1148
See also Editorial.....	1058
<b>Encephalitis, Epidemiology of—With Special Reference to the 1933 Epidemic.</b> James P. Leake, M.D.....	1140
<b>Encephalitis in St. Louis.</b> Editorial.....	1058
<b>Encephalitis in St. Louis, The Story of the Epidemic of.</b> Joseph F. Bredeck, D.P.H....	1135
<b>Endemic Typhus and Rocky Mountain Spotted Fever, Laboratory Diagnosis of.</b> L. F. Badger, M.D.....	19
<b>Engineer's Work, The Public Health.</b> Abel Wolman.....	329
<b>England, Child Health and Child Welfare in.</b> Richard Arthur Bolt, M.D., Dr.P.H.....	1198
<b>England, Depression and Health in.</b> Editorial.....	1170
<b>Enslow, L. H., Chairman.</b> Report of the Committee on Fellowship and Membership of the Public Health Engineering Section.....65,	1316
<b>Enteric Disease, Agglutination in the Diagnosis of.</b> Ruth Gilbert, M.D., and Marion B. Coleman.....	693
<b>Environmental Sanitation, Promotion of—Report of the Committee on.</b> V. M. Ehlers, Chairman.....Year Book,	103
<b>Epidemic Encephalitis Symposium:</b> Discussion by Theodore C. Hempelmann, M.D.; Howard Anderson McCordock, M.D.; Ralph S. Muckenfuss, M.D., and Thomas M. Rivers, M.D.....	1148
<b>Epidemiology of Encephalitis—With Special Reference to the 1933 Epidemic.</b> James P. Leake, M.D.....	1140
<b>The Story of the Epidemic of Encephalitis in St. Louis.</b> Joseph F. Bredeck, D.P.H.....	1135
<b>Types of Epidemic Encephalitis: A Comparison of the Cases Seen in St. Louis in 1933 with Those Seen in New York City.</b> Josephine B. Neal, M.D.....	1144
See also Editorial.....	1058
<b>Epidemic Encephalitis, Types of: A Comparison of the Cases Seen in St. Louis in 1933 with Those Seen in New York City.</b> Josephine B. Neal, M.D.....	1144
<b>Epidemics of Septic Sore Throat, "Mixed."</b> Paul B. Brooks, M.D.....	1165
<b>Epidemiology and Air Travel.</b> Editorial.....	828
<b>Epidemiology, Current Work of the Section on.</b> Haven Emerson, M.D.....	341

	Page
<b>Epidemiology of Encephalitis—With Special Reference to the 1933 Epidemic.</b> James P. Leake, M.D. ....	1140
<b>Epidemiology of Syphilis and Gonorrhea</b> (followed by Discussion by Edward S. Godfrey, Jr., M.D.). William L. Munson, M.D. ....	797
<b>Errors and Omissions.</b> Corrections. Seventh Edition, Standard Methods for the Examination of Water and Sewage. ....	1179
<b>Erythema Infectiosum in Elmsford, N. Y., Outbreak of.</b> Phyllis Schuyler Kerr, M.D., and Edward H. Marsh, M.D., Dr.P.H. ....	1271
<b>Etchells, J. L., and Devereux, E. D.</b> A Yeast Extract Medium for Determining the Bacterial Content of Milk by the Plate Method. ....	149
<b>Evans, Robley D., Ph.D.</b> Radium Poisoning—A Review of Present Knowledge. ....	1017
<b>Examination of Domestic Servants, Medical.</b> Charles V. Craster, M.D., D.P.H. ....	433
<b>Executive Office Staff of the American Public Health Association.</b> .... Year Book,	15

## F

<b>Faber, Harold K., M.D.</b> Mechanism of Infection in Poliomyelitis. ....	1024
<b>Familial Contact with Pulmonary Tuberculosis, Risk of Persons in.</b> W. H. Frost, M.D. ....	426
<b>Farm Sewage Disposal Plants, Survey of Thirty-Five Demonstration.</b> Report of the Joint Committee on Rural Sanitation of A.P.H.A. and the Conference of State Sanitary Engineers, in cooperation with a committee of the Society of Agricultural Engineers, H. B. Hommon, Chairman. .... Year Book,	116
<b>Fathers, Classes for Expectant.</b> Eldred V. Thichoff, M.D. ....	1200
<b>Feces Specimen Container, A Convenient.</b> M. Frobisher, Jr. ....	851
<b>Federal Food and Drugs Act, Proposed: Its Public Health Features.</b> Walter S. Frisbie. ....	1232
See Editorial, Senate Bill No. 1944. ....	1295
<b>Feeding Device, A Hypoclorite.</b> Frank R. Shaw, Robert W. Kehr and Edwin T. Matthews. ....	1075
<b>Feeding of Dairy Cattle, Production of Antirachitic Milk by the.</b> J. G. Hardenbergh, V.M.D., and L. T. Wilson, Ph.D. ....	230
<b>Feemster, Roy F., M.D., Dr.P.H., and Bigelow, George H., M.D.</b> Milk-Borne Disease in Massachusetts, 1930-1932. ....	571
<b>Fellers, Carl R., Ph.D.</b> Nutritive Value of Cranberries. ....	13
<b>Fellowship and Membership of the Public Health Engineering Section, Report of the Committee on.</b> L. H. Enslow, Chairman. ....	65, 1316
<b>Fence or the Ambulance, The</b> (poem). John N. Hurty, M.D. ....	796
<b>Ferrell John A., M.D., Dr.P.H.:</b> America's Contributions and Problems in Public Health. Presidential Address... Health Problems Peculiar to the Southern States. ....	1115 441
<b>Fibrosis of the Udder, Relationships of Leucocytes and Streptococci to.</b> G. J. Hucker, Ph.D. ....	237
<b>Finlay, Dr. Carlos J.</b> The Work of Walter Reed and His Associates of the Medical Department of the United States Army. Major General Robert U. Patterson. ....	1127
<b>Fishbein, Morris, M.D.</b> The Physician and Public Health Officialdom. ....	1223
<b>Fletcher, A. H., and Clark, A. E.</b> Application of the Principles of Water Purification to the Control of Swimming Pools. ....	407
<b>Fletcher, A. H., and Link, E. C.</b> Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools. ....	1255
<b>Flinn, Frederick B., Chairman.</b> Report of the Committee on Industrial Fatigue. .... Year Book,	74
<b>Flocculation, Nonspecific, of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer.</b> John F. Anderson, M.D., George F. Leonard, M.D., and August Holm, Sc.D. ....	681
<b>Fluorides, Toxicity of Organic.</b> William P. Yant. ....	930
<b>Food and Drugs Act, Proposed Federal: Its Public Health Features.</b> Walter S. Frisbie. ....	1232
See Editorial, Senate Bill No. 1944. ....	1295
<b>Food and Health.</b> Henry C. Sherman. ....	335
<b>Food and Nutrition Section.</b> Walter S. Frisbie, Associate Editor. .... 70, 162, 274, 375, 512, 632, 740, 869, 994, 1088, 1194, 1321	
<b>Food Handlers.</b> See Medical Examination of Domestic Servants. Charles V. Craster, M.D. ....	433
<b>"Food-Poisoning"—A Public Health Problem.</b> J. C. Geiger, M.D., and J. P. Gray, M.D. ....	1039
<b>Foodstuffs, Fumigation of.</b> C. L. Williams, M.D. ....	561
<b>Frank, Fannie Mae, and Howell, Ellen.</b> Automatic Pipette Washer. ....	1186
<b>Frisbie, Walter S., Associate Editor.</b> See Food and Nutrition Section.	
<b>Frisbie, Walter S.</b> Proposed Federal Food and Drugs Act: Its Public Health Features. ....	1232
See Editorial, Senate Bill No. 1944. ....	1295
<b>Frobisher, M., Jr.</b> A Convenient Feces Specimen Container. ....	851
<b>Frost, W. H., M.D.</b> Risk of Persons in Familial Contact with Pulmonary Tuberculosis. ....	426
<b>Frosted Hamburg Steak, Bacterial Content of.</b> Laurence P. Geer, William T. Murray and Ernest Smith. ....	673
<b>Frozen Vegetables.</b> Robert P. Straka and Lawrence H. James. ....	700
<b>Fruit Beverages, Health Aspects of.</b> Walter H. Eddy, Ph.D. ....	129

	Page
Fruits and Vegetables, Report of the Committee on. Walter H. Eddy, Ph.D., Chairman. . . . .	Year Book, 71
Fumigation of Foodstuffs. C. L. Williams, M.D. . . . .	561

## G

Gage, Stephen DeM. Aerial Nuisances from the Refining and Burning of Petroleum Oils (followed by Discussion, by Edward Wright, 102). . . . .	97
Galdston, Iago, M.D. Health Education. . . . .	337
Gardner, Leroy U., M.D. Pathology of So-Called Acute Silicosis. . . . .	1240
Geer, Laurence P., Murray, William T., and Smith, Ernest. Bacterial Content of Frosted Hamburg Steak. . . . .	673
Gehrmann, G. H., M.D. Prevention of Lead Poisoning in Industry. . . . .	687
Geiger, Jacob C., M.D. Relationship Between Health Officer and Nurse: Points of View of a Health Officer. . . . .	697
Geiger, J. C., M.D., and Gray, J. P., M.D. "Food-Poisoning"—A Public Health Problem. . . . .	1039
German Health Center for Mental Disorders. . . . .	672
Germany, The Effects of Unemployment on Children and Young People in. Richard A. Bolt, M.D., Dr.P.H. . . . .	744
Germany—Young Unemployed. . . . .	224
Gibbard, James. The Treatment of Water by Certain Forms of Silver. . . . .	910
Gilbert, Ruth, M.D., and Clark, M.E. The Use of Glycerol as a Preservative for Milk Specimens to Be Examined for Hemolytic Streptococci. . . . .	720
Gilbert, Ruth, M.D., and Coleman, Marion B. Agglutination in the Diagnosis of Enteric Disease. . . . .	693
Gilbert, Ruth, M.D., Referee. Standardization of the Complement-Fixation Test for Syphilis. Abstract of Report of the Referee on the—presented to the Committee on Standard Methods of the Laboratory Section. . . . .	499
Glycerol as a Preservative for Milk Specimens to Be Examined for Hemolytic Streptococci, The Use of. Ruth Gilbert, M.D., and M. E. Clark. . . . .	720
Godfrey, Edward S., Jr., M.D.: Discussion, following "Epidemiology of Syphilis and Gonorrhea" by William L. Munson, M.D. . . . .	808
Practical Uses of Diphtheria Immunization Records. . . . .	809
Gonorrhea, Epidemiology of Syphilis and (followed by Discussion by Edward S. Godfrey, Jr., M.D.). William L. Munson, M.D. . . . .	797
Gordon, John Blake. Incineration in Washington. . . . .	155
Gorgas, Major William Crawford. The Work of Walter Reed and His Associates of the Medical Department of the United States Army. Major General Robert U. Patterson. . . . .	1127
Gorham, Frederic Poole, 1871-1933. John W. M. Bunker. . . . .	716
Gorham, Frederic P., Referee. Report of the Referee on Oyster Analysis presented to the Committee on Standard Methods. . . . .	56
Gorman, A. E., Chairman. Abstract of Report of the Committee on Public Health Engineering Manual. . . . .	63
Gray, J. P., M.D., and Geiger, J. C., M.D. "Food-Poisoning"—A Public Health Problem. . . . .	1039
Great Britain, Letter from. See Letter from Great Britain.	
Green, Carl E. The Sanitary Control over the Production and Handling of Shellfish on the Pacific Coast. . . . .	895
Greenburg, Leonard, M.D., Ph.D., and Hayhurst, Emery R., M.D., Ph.D., Associate Editors. See Industrial Hygiene Section.	
Gruenberg, Benjamin C. Motivation in Health Education. . . . .	114

## H

Hamann, E. L., Huddleson, I. Forest, and Johnson, Howard W. A Study of the Opsonocytophagic Power of the Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man. . . . .	917
Hamburg Steak, Frosted, Bacterial Content of. Laurence P. Geer, William T. Murray and Ernest Smith. . . . .	673
Hamilton, Alice, M.D. Industrial Hygiene. . . . .	332
Handling Water Samples, Present Status of: Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions With Special Reference to the Direct Method. Elfreda L. Caldwell and Leland W. Parr, Ph.D. . . . .	467
Hansen, P. Arne, Hucker, G. J., Ph.D., and Snyder, Marion A. Hemolytic Properties of the Mastitis Streptococcus. . . . .	1262
Hansen, Paul, Chairman. Report of the Committee on Scope and Policy. . . . .	1315
Hardenbergh, J. G., V.M.D., and Wilson, L. T., Ph.D. Production of Antirachitic Milk by the Feeding of Dairy Cattle. . . . .	230
Harlan County, Ky. Child Health in Mining Camp and Village. Iva M. Miller. . . . .	517
Harmon, G. E., M.D. Seasonal Distribution of Whooping Cough for Periods of High and Low Incidence. . . . .	789
Hus Diabetes Become More Prevalent? Charles Bolduan, M.D. . . . .	1282

	Page
Hatfield, Hazel M., M.D., and Mann, Alice G. Value of Culture Tests in the Diagnosis of Diphtheria. . . . .	847
Hats and Stethoscopes. . . . .	783
Havens, Leon C., M.D. The Bacteriology of the Intestinal Pathogens. . . . .	105
Hayhurst, Emery R., M.D., Chairman. Report of the Committee on Ventilation and Atmospheric Pollution. . . . . Year Book,	134
Hayhurst, Emery R., M.D., Ph.D., and Greenburg, Leonard, M.D., Ph.D., Associate Editors. See Industrial Hygiene Section.	
Health and Sunlight. Haven Emerson, M.D. . . . .	437
Health Aspects of Fruit Beverages. Walter H. Eddy, Ph.D. . . . .	129
Health Center Mental Hygiene Program, The Aim and Accomplishments of a. Elizabeth I. Adamson, M.D. . . . .	211
Health Education. Iago Galdston, M.D. . . . .	337
Health Education, Motivation in. Benjamin C. Gruenberg. . . . .	114
Health Officer and Nurse, Relationship Between: Points of View of a Health Officer. Jacob C. Geiger, M.D. . . . .	697
Health Officer, Statistics and the. George B. L. Arner, Ph.D. . . . .	28
Health Officers, Current Preoccupations of. Huntington Williams, M.D., Dr.P.H. . . . .	323
Health Officers' World, The—A New Journal. Editorial. . . . .	352
Health Personnel, The Training of. W. S. Leathers, M.D., and A. E. Keller, M.D. . . . .	816
Health Problems Peculiar to the Southern States. John A. Ferrell, M.D., Dr.P.H. . . . .	441
Hedrich, A. W., Sc.D., Chairman: How Are Vital Statistics Being Used and by Whom? Report of the Committee on Forms and Methods of Statistical Practice. . . . . Year Book,	62
Occupational Mortality Statistics. Report of the Committee on Forms and Methods of Statistical Practice. . . . . Year Book,	68
Hedrich, A. W., Sc.D. The Need of an Index Statisticus. . . . .	1159
Hemolytic Properties of the Mastitis Streptococcus. P. Arne Hansen, G. J. Hucker, Ph.D., and Marion A. Snyder. . . . .	1262
Hemolytic Streptococci, The Use of Glycerol as a Preservative for Milk Specimens to Be Examined for. Ruth Gilbert, M.D., and M. E. Clark. . . . .	720
Hempelmann, Theodore C., M.D. Discussion (in Epidemic Encephalitis Symposium). . . . .	1149
Hess, Alfred F., M.D., and Kirby, Daniel B., M.D. The Incidence of Xerophthalmia and Night-Blindness in the United States—A Gauge of Vitamin A Deficiency. . . . .	935
Hincks, Clarence M., M.D. Discussion of Mental Hygiene Symposium papers. . . . .	209
Hiscock, Ira V. Letter to the Editor (on "Community Health Organization"). . . . .	1303
See also Letter to the Editor, by G. M. Mackenzie, M.D. . . . .	1057
Hiscock, Ira V., Chairman. Resolutions, adopted by the Governing Council of the American Public Health Association October 26, 1932. . . . . Year Book,	37
Hiscock, Ira V., and Vaughan, Henry F., Dr.P.H., Associate Editors. See Public Health Administration Section.	
Holm, August, Sc.D., Anderson, John F., M.D., and Leonard, George F., M.D. Non-specific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer. . . . .	681
Holmquist, C. A., Chairman. Progress Report of the Committee on Milk Supply of A.P.H.A. and the Committee on Milk Sanitation of the Conference of State Sanitary Engineers. . . . . Year Book,	88
Hommon, H. B., Chairman. Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. Report of the Joint Committee on Rural Sanitation of A.P.H.A. and the Conference of State Sanitary Engineers, in cooperation with a committee of the Society of Agricultural Engineers. . . . . Year Book,	116
Hookworm. See Health Problems Peculiar to the Southern States. John A. Ferrell, M.D. . . . .	441
Housing of Health Departments. Report of the Committee on Business Management. George C. Ruhland, M.D., Chairman. . . . . Year Book,	50
How Are Vital Statistics Being Used and by Whom? Report of the Committee on Forms and Methods of Statistical Practice. A. W. Hedrich, Sc.D., Chairman. . . . . Year Book,	62
Howell, Ellen, and Frank, Fannie Mae. Automatic Pipette Washer. . . . .	1186
Hucker, G. J., Ph.D. Relationships of Leucocytes and Streptococci to Fibrosis of the Udder. . . . .	237
Hucker, G. J., Ph.D., Snyder, Marion A., and Hansen, P. Arne. Properties of the Mastitis Streptococcus. . . . .	1262
Huddleson, I. Forest, Johnson, Howard W., and Hamann, E. E. A Study of the Opsonocytophagic Power of the Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man. . . . .	917
Hunter, A. C., Ph.D., Chairman. The Need for Improved Sanitation in the Seafoods Industries. Report of the Committee on Fish and Shellfish. . . . . Year Book,	58
Hurty, John N., M.D. The Fence or the Ambulance (poem). . . . .	796
Hygeia Harkens to Noise. Progress Report of the Committee on Noise. C. R. Cox, Chairman. . . . . Year Book,	92
Hypochlorite Feeding Device, A. Frank R. Shaw, Robert W. Kehr and Edwin T. Matthews. . . . .	1075



## I

Page

Immunization in Private Practice, Diphtheria. Gaylord W. Anderson, M.D., and George H. Bigelow, M.D., D.P.H.....	655
Immunization Records, Practical Uses of Diphtheria. Edward S. Godfrey, Jr., M.D....	809
Inaugural Address—Western Branch A.P.H.A. J. L. Pomeroy, M.D.....	812
Incidence of Xerophthalmia and Night-Blindness in the United States, The—A Gauge of Vitamin A Deficiency. Alfred F. Hess, M.D., and Daniel B. Kirby, M.D.....	935
Incineration in Washington. John Blake Gordon.....	155
Index Statisticus, The Need of an. A. W. Hedrich, Sc.D.....	1159
Indianapolis Meeting, The. Editorial.....	826
Industrial Dermatitis in the United States. Louis Schwartz, M.D.....	1049
Industrial Fatigue, Report of the Committee on. Frederick B. Flinn, Chairman.....	Year Book, 74
Industrial Hygiene:	
See Pathology of So-Called Acute Silicosis. Leroy U. Gardner, M.D.....	1240
See The Roentgenogram in So-Called "Acute" Silicosis. Homer L. Sampson.....	1237
See The Silica Content of the Lungs of a Group of Tunnel Workers. Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D.....	1250
Industrial Hygiene. Alice Hamilton, M.D.....	332
Industrial Hygiene Section. Emery R. Hayhurst, M.D., Ph.D., and Leonard Greenburg, M.D., Ph.D., Associate Editors....	66, 158, 270, 368, 509, 628, 733, 861, 990, 1081, 1191, 1317
Industrial Medicine.....	18
Industrial Plant Sanitation, Report of the Committee on. F. G. Legg, Jr., Chairman...	Year Book, 79
Industry in Medicine. C.-E. A. Winslow, Dr.P.H.....	450
Industry, Prevention of Lead Poisoning in. G. H. Gehrmann, M.D.....	687
Infant Hygiene Field Work, A Plan to Obtain More Accurate Records of. C. A. Sargent, M.D.....	677
Infection in Pollomyelitis, Mechanism of. Harold K. Faber, M.D.....	1024
Injuries Produced by Contact with Electric Circuits.....	425
Inter-Chamber Health Conservation Contest, Announcement of the 1933.....	712
International Congress on Working Mothers and Their Children.....	900
Intestinal Pathogens, The Bacteriology of the. Leon C. Havens, M.D.....	105
Iron in Blood Restoration, Significance of Copper and. C. A. Elvehjem, Ph.D.....	1285
Irradiation with Ultra-violet Rays, Antirachitic Activation of Milk by Direct. G. C. Supplee, Ph.D.....	225
Is Malnutrition Increasing? Esther Jacobs.....	784
Italian Mutual Benefit Funds in Elementary Schools.....	1126
Italian Traveling Maternal and Child Health Centers.....	696
Italy, Antituberculosis Work Among Children in.....	692
Italy, Marriage Premiums in.....	942
Italy's Child Welfare Law, Amendment of.....	1044

## J

Jacobs, Esther. Is Malnutrition Increasing.....	784
James, Lawrence H., and Straka, Robert P. Frozen Vegetables.....	700
Jenn, Sally Lucas. School Health Program for the Virgin Islands of the United States.	516
Johnson, Howard W., Hamann, E. E., and Huddleston, I. Forest. A Study of the Opsono-Cytophagic Power of the Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man.....	917
Johnson, W. Scott. Milk Control Schools.....	366
Johnston, Dr. Wyatt—Laboratory Letters of Interest, from. Association News.....	1300

## K

Kehr, Robert W., Matthews, Edwin T., and Shaw, Frank R. A Hypochlorite Feeding Device.....	1075
Keller, A. E., M.D., and Leathers, W. S., M.D. The Training of Health Personnel.....	816
Kendrick, Pearl L., Sc.D. Rapid Agglutination Technic Applied to B. Pertussis Agglutination.....	1310
Kerr, Phyllis Schuyler, M.D., and Marsh, Edward H., M.D., Dr.P.H. Outbreak of Erythema Infectiosum in Elmsford, N. Y.....	1271
King, William F., M.D. The Indianapolis Meeting.....	834
Kirby, Daniel B., M.D., and Hess, Alfred F., M.D. The Incidence of Xerophthalmia and Night-Blindness in the United States—A Gauge of Vitamin A Deficiency.....	935
Kline, Edmund K., Dr.P.H. Whooping Cough Plates in a Public Health Laboratory...	493
Knyaz, Georges, Ph.D. Some Variants of Bacillus Megatherium.....	260
Kramer, S. D., M.D., and Barnes, L. A., Ph.D. A Test for Reaction-Producing Substances in Concentrated Antipneumococcic Serum—Preliminary Report.....	616

## L

Laboratory Aids in the Diagnosis and Serum Therapy of Pneumococcus Pneumonia. Albert B. Sabin, M.D.....	978
Laboratory Diagnosis of Endemic Typhus and Rocky Mountain Spotted Fever. L. F. Badger, M.D.....	19
Laboratory Field, Activities and Trends in the. George W. McCoy, M.D.....	218
Laboratory Letters of Interest—from Dr. Wyatt Johnston. Association News.....	1200

	Page
Laboratory Section, John F. Norton, Ph.D., Associate Editor.....	56, 149, 259, 359, 493, 616, 720, 847, 978, 1067, 1182, 1310
Lactometer for the Public Health Laboratory Control of Market Milk, A Modified Quevenne, R. V. Stone.....	939
LaMalle, Helen C., R.N. Trends in Public Health Nursing.....	339
Larkum, N. W., Ph.D. Production of Antitoxins by Means of Bacteriophage.....	1155
Lead Poisoning in Industry, Prevention of, G. H. Gehrmann, M.D.....	687
Lenke, James P., M.D. Epidemiology of Encephalitis—With Special Reference to the 1933 Epidemic.....	1140
Leathers, W. S., M.D., Chairman, Committee on Professional Education. College Enrollment in Public Health; and Classification of Public Health Degrees Granted in 1933.....	1124
See also Report by C. E. Turner, Chairman.....	Year Book, 120
Leathers, W. S., M.D., and Keller, A. E., M.D. The Training of Health Personnel.....	816
Legg, F. G., Jr., Chairman. Report of the Committee on Industrial Plant Sanitation..	Year Book, 79
	856
Lenert, Louva G. A Deep Water Sampling Rod.....	
Leonard, George F., M.D., Holm, August, Sc.D., and Anderson, John F., M.D. Non- specific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Id Titer.....	681
Letter from Great Britain. Charles Porter, M.D. (London).....	140, 249, 484, 725, 831, 1172
Letters from Great Britain. Charles Porter, M.D.:	
Britain's Premier Health Congress.....	831
Disappearing Salary Cuts.....	249
Disease Incidence.....	1173
Father of the English Health Service, The.....	142
First Line of Defence, The.....	484
Good Houses or Good Food?.....	725
Health Work in London.....	142
Honorary Fellows of the Royal Sanitary Institute.....	251
Hospital Accommodation in London.....	250
London School Medical Report, The.....	1172
Maternity and Child Welfare Conference, The.....	832
Matters of Moment.....	831
Missing Sense and the Climate, The.....	1174
Outbreak of Enteric Fever, An.....	140
Presidency of the Society of Medical Officers of Health, The (Charles Porter, M.D., President).....	833
Report of the Senior Medical Inspector of Factories.....	140
Solving the Slum Problem.....	725
Training of the Nurse for the Nursery, The.....	832
Unemployment and the Public Health.....	1173
Various Conferences.....	727
Views on Economy Reports.....	249
Voluntary Medical and Surgical Services in London.....	485
Letters to the Editor:	
Hiscock, Ira V. (on "Community Health Organization").....	1303
Mackenzie, G. M., M.D. (on "Community Health Organization").....	1057
Massey, Bradford, M.D. (on article by William H. Park, M.D., "Replacement of Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage," 660).....	948
Peter, W. W., M.D., Dr.P.H. (on Cleanliness Institute).....	53
Leucocytes and Streptococci to Fibrosis of the Udder, Relationships of, G. J. Hucker, Ph.D.....	237
Levin, William, Dr.P.H., and Cary, Helen A., M.D. Antigenic Value of Commercial Diphtheria Toxoids.....	1067
Levine, Max, Ph.D. Purification of Beet Sugar Wastes.....	585
Light of Cities, Effects of Air Contaminants on the Natural, H. B. Meller and Mary E. Wurga.....	217
Lininger, Fred F., Ph.D. Relation of the Use of Milk to the Physical and Scholastic Progress of Undernourished School Children.....	555
Link, E. C., and Fletcher, A. H. Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools.....	1255
Littell, Elton G., M.D. Early Diagnosis of Tuberculosis Among Children.....	145
Loss of Actinic Sunshine as a Health Problem of Cities, Fred O. Tonney, M.D.....	775
Lowrie, Robert J., M.D. Suggested Method of Computing and Standardizing the Maternal Mortality Rate.....	459
	51
Lummis, Dr. G. D., Service of Association News.....	
Lungs of a Group of Tunnel Workers, The Silica Content of the, Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D.....	1250

M

MacDougall, Eyn F., R.N., Associate Editor. See Public Health Nursing Section.	
Mackenzie, G. M., M.D. Letter to the Editor (on Community Health Organization)....	1057
Madrid, School Medical Inspection in.....	1284

	Page
Malarial Fever. Editorial.....	944
Mallmann, W. L., Ph.D., and Cary, William, Jr. Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine, With Particular Reference to Swimming Pool Water.....	35
Malnutrition Increasing, Is? Esther Jacobs.....	784
Mann, Alice G., and Hatfield, Hazel M., M.D. Value of Culture Tests in the Diagnosis of Diphtheria.....	847
Marsh, Edward H., M.D., Dr.P.H., and Kerr, Phyllis Schuyler, M.D. Outbreak of Erythema Infectiosum in Elmsford, N. Y.....	1271
Massachusetts, Milk-Borne Disease in—1930-1932. George H. Bigelow, M.D., and Roy F. Feemster, M.D., Dr.P.H.....	571
Masser, Bradford, M.D. Letter to the Editor (on article by William H. Park, M.D., Replacement of Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage, 600).....	948
Mastitis Streptococcus, Hemolytic Properties of the. P. Arne Hansen, G. J. Hucker, Ph.D., and Marion A. Snyder.....	1262
Maternal and Child Health Centers in Italy, Traveling.....	696
Maternal and Child Health Work Under Social Insurance in France.....	566
Maternal Mortality Rate, Suggested Method of Computing and Standardizing the. Robert J. Lowrie, M.D.....	459
Maternal Mortality Study for Cleveland, Ohio. Richard A. Bolt, M.D., Dr.P.H.....	109
Maternity Leave in Denmark.....	34
Matthews, Edwin T., Shaw, Frank R., and Kehr, Robert W. A Hypochlorite Feeding Device.....	1075
McCall, John Oppie, D.D.S. A New Ramification of the Dental Problem.....	1324
McCordock, Howard Anderson, M.D. Discussion (in Epidemic Encephalitis Symposium).....	1152
McCoy, George W., M.D. Activities and Trends in the Laboratory Field.....	318
Meat (and Milk) Inspection in the United States. Editorial.....	604
Mechanism of Infection in Pollomyelitis. Harold K. Faber, M.D.....	1024
Medical Examination of Domestic Servants. Charles V. Craster, M.D., D.P.H.....	433
Medicine, Industry in. C.-E. A. Winslow, Dr.P.H.....	450
Megatherium, Bacillus, Some Variants of. Georges Knaysi, Ph.D.....	260
Meller, H. B., and Wurga, Mary E. Effects of Air Contaminants on the Natural Light of Cities.....	217
Mendelsohn, I. W., Chairman. Public Health Engineering Functions of City Health Departments. Report of the Committee on Record Forms..... Year Book,	108
Mental Disorders, German Health Centers for.....	672
Mental Health of the Preschool Child. Ira S. Wile, M.D.....	191
Mental Hygiene of Adolescence. William A. White, M.D.....	206
Mental Hygiene Program, The Aim and Accomplishments of a Health Center. Elizabeth I. Adamson, M.D.....	211
Mental Hygiene Symposium, followed by Discussion by Clarence M. Hincks, M.D.....	209
Method of Computing and Standardizing the Maternal Mortality Rate, Suggested. Robert J. Lowrie, M.D.....	459
Milk, A Modified Quevenne Lactometer for the Public Health Laboratory Control of Market. R. V. Stone.....	939
Milk, A Study of the Brom-Thymol-Blue Reaction in Freshly Drawn. C. S. Bryan.....	721
Milk Analysis, Proposed Changes in the New (Sixth) Edition of the Standard Methods of. Report of the Committee on Standard Methods of Milk Analysis. Robert S. Breed, Ph.D.....	359
Milk and Dairy Products, Report of the Committee on. W. B. Palmer, Chairman..... Year Book,	82
Milk and Growth.....	1048
Milk and Meat Inspection in the United States. Editorial.....	604
Milk, Antirachitic. See Prevention of Rickets. Editorial.....	45
Milk, Antirachitic Activation of, by Direct Irradiation with Ultra-violet Rays. G. C. Supplee, Ph.D.....	225
Milk-Borne Disease in Massachusetts, 1930-1932. George H. Bigelow, M.D., and Roy F. Feemster, M.D., Dr.P.H.....	571
Milk by the Plate Method, A Yeast Extract Medium for Determining the Bacterial Content of. E. D. Devereux and J. L. Etchells.....	149
Milk Control Schools. W. Scott Johnson.....	366
Milk, Does Heating Injure the Nutritive Properties of? Editorial.....	476
Milk for Children in the Emergency.....	377
Milk, Infected. See Undulant Fever.....	449
Milk, Natural and Induced Variations in the Vitamin Values of. H. C. Sherman.....	1031
Milk, Production of Antirachitic, by the Feeding of Dairy Cattle. J. G. Hardenbergh, V.M.D., and L. T. Wilson, Ph.D.....	230
Milk, Relation of the Use of, to the Physical and Scholastic Progress of Undernourished School Children. Fred F. Lininger, Ph.D.....	555
Milk Samples, Preservation of, With Brilliant Green for Streptococcus and Abortus Examination. C. S. Bryan.....	1182
Milk Specimens to Be Examined for Hemolytic Streptococci, The Use of Glycerol as a Preservative for. Ruth Gilbert, M.D., and M. E. Park.....	720

# INDEX

25

	Page
Milk Supply. Progress Report of the Committee on Milk Supply of A.P.H.A. and the Committee on Milk Sanitation of the Conference of State Sanitary Engineers.	88
C. A. Holmquist, Chairman.....	10
Milk, The Addition of Vitamin D Concentrate to. Theodore F. Zucker, Ph.D.....	1060
Milk, Vitamin D, and the Health Officer. Editorial.....	909
Mills, Relative Merits of Raw and Pasteurized.....	517
Miller, Arthur P., C.F., Associate Editor. See Public Health Engineering Section.	517
Miller, Iva M. Child Health in Mining Camp and Village (Harlan County, Ky.). Iva M. Miller.....	1165
Mining Camp and Village, Child Health in (Harlan County, Ky.). Paul B. Brooks, M.D.....	939
"Missed" Epidemics of Septic Sore Throat. Paul B. Brooks, M.D.....	901, 1065
Modified Quevenne Lactometer for the Public Health Laboratory Control of Market	114
Mortality, Resident, from Tuberculosis in Urban and Rural New York According to	47
Age, Sex, Color, and General Nativity. Elizabeth Parkhurst.....	458
Motivation in Health Education. Benjamin C. Gruenberg.....	1148
Mottled Enamel. Editorial.....	797
Mouth Condition, Scholastic Standing and.....	115
Muckenfuss, Ralph S., M.D. Discussion (in Epidemic Encephalitis Symposium).....	673
Munson, William L., M.D. Epidemiology of Syphilis and Gonorrhea (followed by Dis-	
cussion by Edward S. Godfrey, Jr., M.D.).....	
Murphy, T. F., M.D., Chairman. Report of the Committee on Registration Affairs.....	
Murray, William T., Smith, Ernest, and Geer, Laurence P. Bacterial Content of	
Frosted Hamburg Steak.....	
N	
National Organization for Public Health Nursing, Records Committee of the. Record	473
Forms for Public Health Nursing.....	1031
Natural and Induced Variations in the Vitamin Values of Milk. H. C. Sherman.....	1144
Neal, Josephine B., M.D. Types of Epidemic Encephalitis: A Comparison of the Cases	58
Seen in St. Louis in 1933 With Those Seen in New York City.....	1159
Need for Improved Sanitation in the Seafoods Industries, The. Report of the Commit-	
tee on Fish and Shellfish. A. C. Hunter, Ph.D., Chairman.....	
Need of an Index Statisticus, The. A. W. Hedrich, Sc.D.....	198
"Nerves" and Badness of Childhood of Any Importance to the Field of Public Health,	259
Are the? Esther L. Richards, M.D.....	1301
Neutralizing Potency of Anti-Meningococcus Serum by the Phenomenon of Local Skin	1324
Reactivity, Titration of the. Grace M. Sickles.....	251
New Members.....	901, 1065
New Ramification of the Dental Problem, A. John Oppie McCall, D.D.S.....	266
New York City Bulletin.....	95, 188, 302, 404, 541, 650, 768, 891, 1016, 1113, 1221, 1340
New York, Resident Mortality from Tuberculosis in Urban and Rural, According to	653
Age, Sex, Color, and General Nativity. Elizabeth Parkhurst.....	1016
Newburyport, Mass., Shellfish Treatment Plant at. Edward Wright.....	302
News from the Field.....	1221
News from the Field.....	188
Activities of League of Mental Hygiene in Brazil.....	1221
Adenoids Among School Children of Naples.....	1016
A.N.A. Delegates to Congress.....	769
Annual Safety Congress.....	892
A.P.H.A. Members Honored by Royal Sanitary Institute.....	769
Association of Military Surgeons of the United States.....	652
Association of Women in Public Health—Ada E. Schweitzer, M.D., President.....	769
Baltimore, New Position Created in.....	405
Birth Control Review Suspends Publication.....	188
Blind in Palestine, The.....	1221
Canadian Public Health Meeting.....	1113
Child Health Association Conference.....	406
Cincinnati, New Butter Ruling in.....	406
Citizens' Councils.....	769
Cleanliness Institute.....	768
Connecticut Public Health Association.....	544
Course for Health Officers.....	1113
Economic Aspects of Medical Care, The.....	652
Edison and Industrial Hygiene.....	302
Extension Course at Albany Medical College.....	1222
Financing Public Improvements.....	891
Folks, Homer, Gives Delta Omega Lecture at Yale.....	768
German Government Aid for Small-Scale Gardening.....	768
Germes Not Killed by Liquid Helium.....	544
Gorgas Memorial Essay Contest.....	1113
Health During the World's Fair.....	652
Heart Committee Meeting.....	302
Heating and Ventilating Exposition.....	891
Immunization Program for Denver.....	

## News from the Field—Continued

	Page
Indiana.....	651
Indiana State Health Department News.....	892
Journals Merge.....	768
Luedde, Dr., Awarded Blindness Prevention Medal.....	768
Maryland-Delaware Association.....	652
Mental Hygiene Movement Celebrates.....	650
Missouri State Board of Health Abolished.....	892
Missouri Water and Sewerage Conference.....	1113
Morale—The Mental Hygiene of Unemployment.....	404
Mother's Day.....	405
National Boys' Week.....	302
National Campaign Rally for Privately Supported Welfare Work in Chicago.....	1221
National Canners Association Convention.....	189
National Negro Health Week Conference.....	1221
National Tuberculosis Association.....	650
New Jersey Education Survey.....	95
New Milwaukee Health Center.....	189
New York Sewage Works Association.....	1222
New York State Sewage Works Association.....	95
Northern California Association Elects Officers.....	650
Ohio State Health Department.....	302
Organizations Meeting with Us at Indianapolis.....	893
Parents-Teachers Congress in Seattle.....	652
Pennsylvania Public Health Association Meeting.....	652
Porter, Dr. Charles: President of the Society of Medical Officers of Health.....	891
Prize for Essay on Goiter.....	302
Psittacosis.....	189
Public Health Nursing Contest.....	95
Public Health Survey.....	189
Ramazzini, Bernardino, Celebration of Birth of.....	892
Resolutions Adopted at the Fourth Annual Convention of the Western Branch, American Public Health Association, Pasadena, Calif., May 29-31.....	770
Rice and Ruhland Sail.....	768
Scientific Crime Detection Course.....	769
September 1932 and January 1933 Journals Needed.....	768
Sewage Association Meets at Rochester.....	772
Sin of Being Dull, The.....	96
Southern California Association Elects Officers.....	406
Spanish Child Health Centers.....	1016
Standards Approved.....	95
Starkloff, Max C.....	651
State Charities Aid Celebrates.....	768
Student Health Association Meeting.....	95
Summer School Courses in Public Health.....	541, 650
Texas Short School on Swimming Pools.....	652
"The Lawyer and His Public".....	302
Wellcome Prize and Medal.....	1221
Western Branch Meeting.....	95
Whole Time Health Officers.....	1113
Yellow Fever Volunteer Dies.....	302
Night-Blindness in the United States, The Incidence of Xerophthalmia and—A Gauge of Vitamin A Deficiency. Alfred F. Hess, M.D., and Daniel B. Kirby, M.D.....	935
Noise, Hygeia Harkens to. Progress Report of the Committee on Noise. C. R. Cox, Chairman.....	92
Nonspecific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer. John F. Anderson, M.D., George F. Leonard, M.D., and August Holm, Sc.D.....	681
Nonspecific Immunity by Heterologous Vaccination. Editorial.....	946
Norton, John F., Ph.D., Associate Editor. See Laboratory Section.	
Nuisances from the Refining and Burning of Petroleum Oils, Aerial (Followed by Dis- cussion, by Edward Wright, 192). Stephen DeM. Gage.....	97
Nurse, Relationship Between Health Officer and: Points of View of a Health Officer. Jacob C. Geiger, M.D.....	697
Nursing, Record Forms for Public Health. Records Committee of the National Organ- ization for Public Health Nursing.....	473
Nursing, Trends in Public Health. Helen C. LaMalle, R.N.....	339
Nutrition. See Food and Nutrition Section.	
Nutritive Value of Cranberries. Carl R. Fellers, Ph.D.....	13

## O

Oberlaender Award Granted Dr. Richard A. Holt.....	253
Obstacles in the No-Diphtheria Path. W. P. Shepard, M.D.....	547
Occupational Mortality Statistics. Report of the Committee on Forms and Methods of Statistical Practice. A. W. Hedrich, Sc.D., Chairman.....	68
Ohio, Ten Years of Public Health Administration in. Robert G. Paterson, Ph.D.....	1045

# INDEX

27

Oils, Aerial Nuisances from the Refining and Burning of Petroleum (Followed by Discussion, by Edward Wright, 102). Stephen DeM. Gage.	Page 97
Only Three Cents for Health. Editorial.	139
Ontario by Survey Methods, Effectiveness of Child Health Programs in. John T. Phair, M.B., D.P.H.	1
Ople, Eugene L., M.D. Recognition and Control of Tuberculosis of Childhood.	305
Opsonic-Cytophagic Power of the Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man, A Study of the. I. Forest Huddleson, Howard W. Johnson, and E. E. Hamann.	917
Organic Fluorides, Toxicity of. William P. Yant.	930
Outbreak of Erythema Infectiosum in Elmsford, N. Y. Phyllis Schuyler Kerr, M.D., and Edward H. Marsh, M.D., Dr.P.H.	1271
Oxidation Potential Concept of Chlorination, The. F. C. Schmelkes.	269
Oyster Analysis, Report of the Referee on—presented to the Committee on Standard Methods. Frederic P. Gorham, Referee.	56
<b>P</b>	
Pacific Coast, The Sanitary Control over the Production and Handling of Shellfish on the. Carl E. Green.	895
Palmer, W. B., Chairman. Report of the Committee on Milk and Dairy Products.	82
Paper-Reading and Discussion.	197
Parental Education and Child Hygiene. Editorial.	278
Park, Doctor, Not to Retire. Editorial.	1293
Park, William Hallock, M.D., Awarded Sedgwick Memorial Medal. Association News.	50
Park, William H., M.D. Replacement of Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage (See Letter to the Editor, from Bradford Massey, M.D., 948).	600
Parkhurst, Elizabeth. Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity.	901, 1065
Parr, Leland W., Ph.D., and Caldwell, Elfreda L. Present Status of Handling Water Samples: Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions With Special Reference to the Direct Method.	467
Pasteurization, Destruction of the Vitamins by. Editorial.	1296
Patterson, Robert G., Ph.D. Ten Years of Public Health Administration in Ohio.	1030
Pathogens, The Bacteriology of (England), Defeat of. Editorial.	479
Pathology of So-Called Acute Silicosis. Leon C. Havens, M.D.	1045
Patterson, Raymond S., Ph.D., Associate Editor. See A Selected Public Health Bibliography—With Annotations.	105
Patterson, Robert U., Major General. The Work of Walter Reed and His Associates of the Medical Department. Abstract, of Report of the Committee on Sewage Disposal.	1240
Pearse, Langdon, Chairman. Abstract, of Report of the Committee on Sewage Disposal.	1127
Pellagra. See Health Problems Peculiar to the Southern States. John A. Ferrell, M.D.	64
Per Capita Cost of Health. See Editorial.	441
Personnel, The Training of Health. W. S. Leathers, M.D., and A. E. Keller, M.D.	139
Pern Child Welfare Clauses in the Constitution of 1933.	1341
Peter, W. W., M.D., Dr.P.H. Letter to the Editor (on Cleanliness Institute).	816
Petroleum Oils, Aerial Nuisances from the Refining and Burning of (Followed by Discussion, by Edward Wright, 102). Stephen DeM. Gage.	1158
Phair, John T., M.B., D.P.H. Effectiveness of Child Health Programs in Ontario by Survey Methods.	53
Physician and Public Health Officialdom, The. Morris Fishbein, M.D.	97
Pickens, Earl Max. Report of an Experiment Determining the Effect of Weather on Children's Sleep.	1
Pipette Washer, Automatic. Ellen Howell and Fannie Mae Frank.	1223
Plan to Obtain More Accurate Records of Infant Hygiene Field Work, A. C. A.	788
Plate Method, A Yeast Extract Medium for Determining the Bacterial Content of Pneumococcus Pneumonia, Laboratory Aids in the Diagnosis and Serum Therapy of.	717
Pneumococcus Pneumonia, Laboratory Aids in the Diagnosis and Serum Therapy of. Report (Joint) of the Committee on Pneumoconiosis and the Committee on Standard Practices in Compensation of Occupational Diseases. R. R. Sayers, M.D., Chairman.	860
See Pathology of So-Called Acute Silicosis. Leroy U. Gardner, M.D.	1186
See The Roentgenogram in So-Called "Acute" Silicosis. Homer L. Sampson.	677
See The Silica Content of the Lungs of a Group of Tunnel Workers. Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D.	149
	978
	100
	1240
	1237
	1250

	Page
<b>Pneumonia, Laboratory Aids in the Diagnosis and Serum Therapy of Pneumococcus.</b>	
Albert E. Sabin, M.D. ....	978
<b>Poliomyelitis, Mechanism of Infection in.</b> Harold K. Faber, M.D. ....	1024
Pomerooy, J. L., M.D. Inaugural Address—Western Branch A.P.H.A. ....	813
Porter, Charles, M.D. Editorial. ....	827
Porter, Charles, M.D. (London) See Letter from Great Britain.	
Porter, Dr. Charles: President of the Society of Medical Officers of Health. ....	83
Practical Uses of Diphtheria Immunization Records. Edward S. Godfrey, Jr., M.D. ....	809
Precaution When Filing Deferred Certificates. Stewart G. Thompson, D.P.H. ....	567
Preliminary Program of the Sixty-second Annual Meeting, American Public Health Association, Indianapolis, Ind., October 9-12, 1933. ....	949
Prenatal and Infant Health Work—Sweden. ....	680
Preschool Center Program of the Cleveland Child Health Association, Report of the. E. V. Thiehoff, M.D. ....	858
Preschool Child, Mental Health of the. Ira S. Wile, M.D. ....	191
Present Status of Handling Water Samples: Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions With Special Reference to the Direct Method. Elfreda L. Caldwell and Leland W. Parr, Ph.D. ....	467
Preservation of Milk Samples with Brilliant Green for Streptococcus and Abortus Examination. C. S. Bryan. ....	1182
Preservative for Milk Specimens to Be Examined for Hemolytic Streptococci, The Use of Glycerol as a. Ruth Gilbert, M.D., and M. E. Clark. ....	720
Presidential Address. America's Contributions and Problems in Public Health. John A. Ferrell, M.D., Dr.P.H. ....	1115
Presumptive Test in the Determination of the Coll-Aerogenes Group, Suggested Procedures for the. C. T. Butterfield. ....	343
Prevention of Lead Poisoning in Industry. G. H. Gehrmann, M.D. ....	687
Prevention of Rickets. Editorial. ....	45
Principles of Water Purification to the Control of Swimming Pools, Application of the. A. H. Fletcher and A. E. Clark. ....	407
Procedures for the Presumptive Test in the Determination of the Coll-Aerogenes Group, Suggested. C. T. Butterfield. ....	343
Production of Antirachitic Milk by the Feeding of Dairy Cattle. J. G. Hardenbergh, V.M.D., and L. T. Wilson, Ph.D. ....	230
Production of Antitoxins by Means of Bacteriophage. N. W. Larkum, Ph.D. ....	1155
Professional Education, Committee on. College Enrollment in Public Health; and Classification of Public Health Degrees Granted in 1933. W. S. Leathers, M.D., Chairman. ....	1124
See also Report by C. E. Turner, Chairman. .... Year Book,	120
Promotion of Environmental Sanitation, Report of the Committee on. V. M. Ehlers, Chairman. .... Year Book,	103
Proper Allocation of Records, Report of the Committee on. J. V. DePorte, Ph.D., Chairman. .... Year Book,	107
Proposed Changes in the New (Sixth) Edition of the Standard Methods of Milk Analysis. Report of the Committee on Standard Methods of Milk Analysis. Robert S. Breed, Ph.D. ....	359
Proposed Federal Food and Drugs Act: Its Public Health Features. Walter S. Frisbie. ....	1232
See Editorial Senate Bill No. 1944. ....	1295
Psychology of Public Education, The. Edward S. Robinson. ....	123
Public Education, The Psychology of. Edward S. Robinson. ....	123
Public Health Administration in Ohio, Ten Years of. Robert G. Paterson, Ph.D. ....	1045
Public Health Administration Section. Henry F. Vaughan, Dr.P.H., and Ira V. Hisecock, Associate Editors. .... 54, 145, 254, 354, 458, 611, 718, 844, 976, 1066, 1180,	1304
Public Health, America's Contributions and Problems in. Presidential Address. John A. Ferrell, M.D., Dr.P.H. ....	1115
Public Health, Are the "Nerves" and Badness of Childhood of Any Importance to the Field of? Esther L. Richards, M.D. ....	198
Public Health Bibliography, A Selected—With Annotations. Raymond S. Patterson, Ph.D., Associate Editor. .... 93, 185, 299, 402, 538, 648, 766, 889, 1014, 1110, 1219,	1338
Public Health, College Enrollment in; and Classification of Public Health Degrees Granted in 1933. Committee on Professional Education—W. S. Leathers, M.D., Chairman. ....	1124
See also Report by C. E. Turner, Chairman. .... Year Book,	120
Public Health Courses. See Committee on Professional Education. ....	1124
See also Report by C. E. Turner, Chairman. .... Year Book,	120
Public Health Degrees Granted in 1933; and College Enrollment in Public Health. Committee on Professional Education—W. S. Leathers, M.D., Chairman. ....	1124
See also Report by C. E. Turner, Chairman. .... Year Book,	120
Public Health Degrees, Use Your. Editorial. ....	138
Public Health Engineering Functions of City Health Departments. Report of the Committee on Record Forms. I. W. Mendelsohn, Chairman. .... Year Book,	108
Public Health Engineering Manual. Abstract, of Report of the Committee on Public Health Engineering Manual. A. E. Gorman, Chairman. ....	63
Public Health Engineering Section. Arthur P. Miller, C.E., Associate Editor. .... 62, 155, 266, 364, 505, 625, 737, 856, 987, 1075, 1315	

	Page
Public Health Engineer's Work, The. Abel Wolman.....	329
Public Health Nursing at the Indianapolis A.P.H.A. Meeting.....	1326
Public Health Nursing, Record Forms for. Records Committee of the National Organization for Public Health Nursing.....	473
Public Health Nursing Section. Eva F. MacDougall, R.N., Associate Editor....76, 168, 281, 379, 519, 637, 747, 873, 1000, 1093, 1202,	1326
Public Health Nursing, Trends in. Helen C. LaMalle, R.N.....	339
Public Health Officialdom, The Physician and. Morris Fishbein, M.D.....	1223
Public Health to the Doctor in Private Practice, The Relationship of. Charles W. Decker, M.D. ....	824
Public Health, Work in Vital Statistics for. Walter F. Willcox, Ph.D.....	326
Publications of the American Public Health Association.....	Year Book, 15
Pulmonary Asbestosis. J. Donnelly, M.D.....	1275
Pulmonary Tuberculosis, Risk of Persons in Familial Contact with. W. H. Frost, M.D.	426
Purification of Beet Sugar Wastes. Max Levine, Ph.D.....	585

## Q

Quevenne Lactometer for the Public Health Laboratory Control of Market Milk, A Modified. R. V. Stone.....	939
-----------------------------------------------------------------------------------------------------------	-----

## R

Radium Poisoning. Editorial.....	350
Radium Poisoning—A Review of Present Knowledge. Robley D. Evans, Ph.D.....	1017
Ramon Flocculation Test. See Nonspecific Flocculation of Diphtheria Antitoxin, Toxin, and Toxoid, and Its Bearing on the Lf Titer. John F. Anderson, M.D., George F. Leonard, M.D., and August Holm.....	681
Rapid Agglutination Technic Applied to B. Pertussis Agglutination. Pearl L. Kendrick, Sc.D. ....	1310
Ravenel, Mazzyck P., M.D. Tuberculosis of Bovine Origin.....	316
Reaction-Producing Substances in Concentrated Antipneumococcal Serum, A Test for —Preliminary Report. L. A. Barnes, Ph.D., and S. D. Kramer, M.D.....	616
Recognition and Control of Tuberculosis of Childhood. Eugene L. Opie, M.D.....	305
Record Forms for Public Health Nursing. Records Committee of the National Organization for Public Health Nursing.....	473
Record Forms, Report of the Committee on. Public Health Engineering Functions of City Health Departments. I. W. Mendelsohn, Chairman.....	Year Book, 108
Records of Infant Hygiene Field Work, A Plan to Obtain More Accurate. C. A. Sargent, M.D. ....	677
Records, Proper Allocation of—Report of the Committee on. J. V. DePorte, Ph.D., Chairman. ....	Year Book, 107
Reed, Walter, and His Associates of the Medical Department of the United States Army, The Work of. Major General Robert U. Patterson.....	1127
Referee on Oyster Analysis, Report of—presented to the Committee on Standard Methods. Frederic P. Gorham, Referee.....	56
Referee on the Standardization of the Complement-Fixation Test for Syphilis, Abstract of Report of the—presented to the Committee on Standard Methods of the Laboratory Section. Ruth Gilbert, M.D., Referee.....	499
Referees of the American Public Health Association.....	Year Book, 26
Refining and Burning of Petroleum Oils, Aerial Nuisances from the (Followed by Discussion, by Edward Wright, 102). Stephen DeM. Gage.....	97
Registration Affairs, Report of the Committee on. T. F. Murphy, M.D., Chairman....	Year Book, 115
Relation of the Use of Milk to the Physical and Scholastic Progress of Undernourished School Children. Fred F. Lininger, Ph.D.....	555
Relationship Between Health Officer and Nurse: Points of View of a Health Officer. Jacob C. Geiger, M.D.....	697
Relationship of Public Health to the Doctor in Private Practice, The. Charles W. Decker, M.D. ....	824
Relationships of Leucocytes and Streptococci to Fibrosis of the Udder. G. J. Hucker, Ph.D. ....	237
Replacement of Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage (see Letter to the Editor, from Bradford Massey, M.D., 948). William H. Park, M.D. ....	600
Report of an Experiment Determining the Effect of Weather on Children's Sleep. Eunice Pierce. ....	860
Report of Executive Board to the Governing Council, American Public Health Association. E. L. Bishop, Chairman.....	Year Book, 29
Report of the Preschool Center Program of the Cleveland Child Health Association. E. V. Thiehoff, M.D.....	858
Report of the Referee on Oyster Analysis presented to the Committee on Standard Methods. Frederic P. Gorham, Referee.....	56
Reports. See Books and Reports.	



**Reports of Committees:**

Bathing Places, Swimming Pools and Places of the American Public Health Association and the Conference of State Sanitary Engineers. W. J. Scott, Chairman.....	Year Book,	40
Business Management. Housing of Health Departments. George C. Ruhland, M.D., Chairman.....	Year Book,	50
Cereals and Their Products. The Vitamin Content of Cereals. F. C. Blanck, Ph.D., Chairman.....	Year Book,	54
Fellowship and Membership of the Public Health Engineering Section. L. H. Enslow, Chairman.....	65,	1316
Fish and Shellfish. The Need for Improved Sanitation in the Seafoods Industries. A. C. Hunter, Ph.D., Chairman.....	Year Book,	58
Forms and Methods of Statistical Practice: How Are Vital Statistics Being Used and by Whom? A. W. Hedrich, Sc.D., Chairman.....	Year Book,	62
Occupational Mortality Statistics. A. W. Hedrich, Sc.D., Chairman.....	Year Book,	68
Fruits and Vegetables. Walter H. Eddy, Ph.D., Chairman.....	Year Book,	71
Industrial Fatigue. Frederick B. Flinn, Chairman.....	Year Book,	74
Industrial Plant Sanitation. F. G. Legg, Jr., Chairman.....	Year Book,	79
Milk Analysis. Proposed Changes in the New (Sixth) Edition of the Standard Methods of Milk Analysis. Robert S. Breed, Ph.D.....	359	
Milk and Dairy Products. W. B. Palmer, Chairman.....	Year Book,	82
Milk Supply. Committee on Milk Supply of A.P.H.A. and the Committee on Milk Sanitation of the Conference of State Sanitary Engineers. C. A. Holmquist, Chairman.....	Year Book,	88
Noise. Hygeia Harkens to Noise. C. R. Cox, Chairman.....	Year Book,	92
Nutritional Problems. H. C. Sherman, Chairman.....	Year Book,	97
Oyster Analysis. Report of the Referee on Oyster Analysis, presented to the Committee on Standard Methods. Frederic P. Gorham, Referee.....	56	
Pneumoconiosis. Report (Joint) of the Committee on Pneumoconiosis and the Committee on Standard Practices in Compensation of Occupational Diseases. R. R. Sayers, M.D., Chairman.....	Year Book,	100
Professional Education. College Enrollment in Public Health Courses; and Classification of Public Health Degrees Granted in 1933. W. S. Leathers, M.D., Chairman.....	1124	
See also Report by C. E. Turner, Chairman.....	Year Book,	120
Promotion of Environmental Sanitation. V. M. Ehlers, Chairman.....	Year Book,	103
Proper Allocation of Records. J. V. DePorte, Ph.D., Chairman.....	Year Book,	107
Public Health Engineering Manual. Abstract. A. E. Gorman, Chairman.....	63	
Record Forms. Public Health Engineering Functions of City Health Departments. I. W. Mendelsohn, Chairman.....	Year Book,	108
Registration Affairs. T. F. Murphy, M.D., Chairman.....	Year Book,	115
Rural Sanitation. Report of the Joint Committee of A.P.H.A. and the Conference of State Sanitary Engineers, in cooperation with a committee of the Society of Agricultural Engineers. Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. H. B. Hommon, Chairman.....	Year Book,	116
Scope and Policy. Paul Hansen, Chairman.....	1315	
Sewage Disposal. Abstract. Langdon Pearse, Chairman.....	64	
Standard Methods. Oyster Analysis. Report of the Referee on Oyster Analysis. Frederic P. Gorham, Referee.....	56	
Standard Methods of Milk Analysis. Proposed Changes in the New (Sixth) Edition of the Standard Methods of Milk Analysis. Robert S. Breed, Ph.D.....	359	
Swimming Pools and Bathing Places. Report of the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers. W. J. Scott, Chairman.....	Year Book,	40
Syphilis. Abstract of Report of Referee on the Standardization of the Complement-Fixation Test for Syphilis, presented to the Committee on Standard Methods of the Laboratory Section. Ruth Gilbert, M.D., Referee.....	499	
Training and Personnel. C. E. Turner, Chairman.....	Year Book,	120
Ventilation and Atmospheric Pollution. Emery R. Hayhurst, M.D., Chairman.....	Year Book,	124
Volatile Solvents. Elizabeth B. Bricker, M.D., Chairman.....	Year Book,	138
Water Supply. Taste and Odor Removal Processes. J. R. Baylis, Chairman.....	Year Book,	126
Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity. Elizabeth Parkhurst.....	301,	1065
Resolutions, adopted by the Governing Council of the American Public Health Association October 26, 1932. Ira V. Hiscock, Chairman.....	Year Book,	37
Richards, Esther L., M.D. Are the "Nerves" and Badness of Childhood of Any Importance to the Field of Public Health?.....	198	
<b>Rickets:</b> See The Addition of Vitamin D Concentrate to Milk. Theodore F. Zucker, Ph.D....	10	
See Antirachitic Activation of Milk by Direct Irradiation With Ultra-violet Rays. G. C. Supplee, Ph.D.....	225	
See Sunlight and Health. Haven Emerson, M.D.....	427	

	Page
Rickets, Prevention of. Editorial.....	45
Risk of Persons in Familial Contact with Pulmonary Tuberculosis. W. H. Frost, M.D..	426
Rivers, Thomas M., M.D. Discussion (in Epidemic Encephalitis Symposium).....	1153
Robinson, Edward S. The Psychology of Public Education.....	123
Rocky Mountain Spotted Fever, Laboratory Diagnosis of Endemic Typhus and. L. F. Badger, M.D. ....	19
Roentgenogram in So-Called "Acute" Silicosis, The. Homer L. Sampson.....	1237
Routzahn, Evar't G., Associate Editor. See Education and Publicity Section.	
Ruhland, George C., M.D., Chairman. Housing of Health Departments. Report of the Committee on Business Management.....Year Book,	50
Rumania—Childbirth Benefits in the New Social Insurance Law.....	1236

S

Sabin, Albert B., M.D. Laboratory Aids in the Diagnosis and Serum Therapy of Pneumococcus Pneumonia.....	978
St. Louis, Encephalitis in:	
Discussion (in Epidemic Encephalitis Symposium) by Theodore C. Hempelmann, M.D.; Howard Anderson McCordock, M.D.; Ralph S. Muckenfuss, M.D.; and Thomas M. Rivers, M.D.....	1148
Editorial. ....	1058
Epidemiology of Encephalitis—With Special Reference to the 1933 Epidemic. James P. Leake, M.D.....	1140
The Story of the Epidemic of Encephalitis in St. Louis. Joseph F. Bredeck, D.P.H.	1135
Types of Epidemic Encephalitis: A Comparison of the Cases Seen in St. Louis in 1933 With Those Seen in New York City. Josephine B. Neal, M.D.....	1144
Sampling Rod, A Deep Water. Louva G. Lenert.....	856
Sampson, Homer L. The Roentgenogram in So-Called "Acute" Silicosis.....	1237
San Francisco, Milk Ordinance Passed In. See Editorial A Triumph for Public Health.	705
Sanitary Control over the Production and Handling of Shellfish on the Pacific Coast, The. Carl E. Green.....	895
Sanitation. See Smoke Abatement at Low Cost. Morris M. Cohn, M.Sc. in C.E.....	668
Sargent, C. A., M.D. A Plan to Obtain More Accurate Records of Infant Hygiene Field Work. ....	677
Sayers, R. R., M.D., Chairman. Pneumoconiosis. Report (Joint) of the Committee on Pneumoconiosis and the Committee on Standard Practices in Compensation of Occupational Diseases. ....Year Book,	100
Scheneccady, N. Y. See Smoke Abatement at Low Cost. Morris M. Cohn, M.Sc. in C.E.	668
Schmelkes, F. C. The Oxidation Potential Concept of Chlorination.....	269
Scholastic Standing and Mouth Condition.....	458
School Health Program for the Virgin Islands of the United States. Sally Lucas Jean.	516
School Physician's Standpoint, The Tuberculin Skin Test from the. L. W. Childs, M.D.	997
Schwartz, Louis, M.D. Industrial Dermatitis in the United States.....	1049
Scott, W. J., Chairman. Swimming Pools and Bathing Places. Report of the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers.....Year Book,	40
Seafoods Industries, The Need for Improved Sanitation in the. Report of the Committee on Fish and Shellfish. A. C. Hunter, Ph.D., Chairman.....Year Book,	58
Seasonal Distribution of Whooping Cough for Periods of High and Low Incidence. G. E. Harmon, M.D.....	789
Sedgwick Memorial Medal Awarded to William Hallock Park, M.D. Association News.	50
Section Councils of the American Public Health Association.....Year Book,	14
Senate Bill No. 1944. Editorial.....	1295
See Proposed Federal Food and Drugs Act, Its Public Health Features. Walter S. Frisbie. ....	1232
Septic Sore Throat, "Missed" Epidemics of. Paul B. Brooks, M.D.....	1165
Serum Therapy of Pneumococcus Pneumonia, Laboratory Aids in the Diagnosis and. Albert B. Sabin, M.D.....	978
Servants, Medical Examination of Domestic. Charles V. Craster, M.D., D.P.H.....	433
Sewage Disposal Plants, Survey of Thirty-Five Demonstration Farm. Report of the Joint Committee on Rural Sanitation of A.P.H.A. and the Conference of State Sanitary Engineers, in cooperation with a committee of the Society of Agricultural Engineers. H. B. Hommon, Chairman.....Year Book,	116
Sewage Disposal. Abstract, of Report of the Committee on. Langdon Pearce, Chairman. ....	64
Shaw, Frank R., Kehr, Robert W., and Matthews, Edwin T. A Hypochlorite Feeding Device. ....	1075
Shellfish on the Pacific Coast, The Sanitary Control over the Production and Handling of. Carl E. Green.....	895
Shellfish Treatment Plant at Newburyport, Mass. Edward Wright.....	266
Shepard, W. P., M.D. Obstacles in the No-Diphtheria Path.....	547
Sherman, Henry C. ....	335
Food and Health.....	1031
Natural and Induced Variations in the Vitamin Values of Milk.....	

	Page
Sherman, Henry C., Chairman. Vitamin C, Report of the Committee on Nutritional Problems. . . . .	Year Book, 97
Sickles, Grace M. Titration of the Neutralizing Potency of Anti-Meningococcus Serum by the Phenomenon of Local Skin Reactivity. . . . .	259
Significance of Copper and Iron in Blood Restoration. C. A. Elvehjem, Ph.D. . . . .	1285
Silica Content of the Lungs of a Group of Tunnel Workers, The. Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D. . . . .	1250
Silicosis:	
See Pathology of So-Called Acute Silicosis. Leroy U. Gardner, M.D. . . . .	1240
See The Roentgenogram in So-Called "Acute" Silicosis. Homer L. Sampson. . . . .	1237
See The Silica Content of the Lungs of a Group of Tunnel Workers. Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D. . . . .	1250
Silicosis in Great Britain, Deaths from. . . . .	122
Silicosis, Pathology of So-Called Acute. Leroy U. Gardner, M.D. . . . .	1240
Silicosis, The Roentgenogram in So-Called "Acute." Homer L. Sampson. . . . .	1237
Silver, The Treatment of Water by Certain Forms of. James Gibbard. . . . .	310
Sixty-Second Annual Meeting, The—Indianapolis, October 9-12. Editorial. . . . .	607
Sixty-Second Annual Meeting, The. Editorial. . . . .	1168
Skin Reaction in Brucella Infection and Immunity in Man, A Study of the Opsonocytophagie Power of the Blood and Allergic. I. Forest Huddleson, Howard W. Johnson and E. E. Hamann. . . . .	917
Skin Reactivity, Titration of the Neutralizing Potency of Anti-Meningococcus Serum by the Phenomenon of Local. Grace M. Sickles. . . . .	259
Skin Test from the School Physician's Standpoint, The Tuberculin. L. W. Childs, M.D. . . . .	997
Sleeping Sickness:	
Discussion (in Epidemic Encephalitis Symposium) by Theodore C. Hempelmann, M.D.; Howard Anderson McCordock, M.D.; Ralph S. Muckenfuss, M.D.; and Thomas M. Rivers, M.D. . . . .	1148
Epidemiology of Encephalitis—With Special Reference to the 1933 Epidemic. James P. Leake, M.D. . . . .	1140
The Story of the Epidemic of Encephalitis in St. Louis. Joseph F. Bredeck, D.P.H. . . . .	1135
Types of Epidemic Encephalitis: A Comparison of the Cases Seen in St. Louis in 1923 With Those Seen in New York City. Josephine B. Neal, M.D. . . . .	1144
See also Editorial. . . . .	1058
Smallpox, Vaccination Against—Or Not? Editorial. . . . .	351
Smith, Clayton S., Ph.D., M.D., and Wikoff, Helen L., Ph.D. The Silica Content of the Lungs of a Group of Tunnel Workers. . . . .	1250
Smith, Ernest, Geer, Laurence P., and Murray, William T. Bacterial Content of Frosted Hamburg Steak. . . . .	673
Smoke Abatement at Low Cost (in Schenectady, N. Y.). Morris M. Cohn, M.Sc. in C.E. . . . .	668
Society of Agricultural Engineers, in coöperation with the Joint Committee on Rural Sanitation of A.P.H.A. and the Conference of State Sanitary Engineers—Report of the Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. H. B. Hommon, Chairman. . . . .	Year Book, 116
Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools. A. H. Fletcher and E. C. Link. . . . .	1255
Some Variants of Bacillus Megatherium. Georges Knaysi, Ph.D. . . . .	260
Sore Throat, "Missed" Epidemics of Septic. Paul E. Brooks, M.D. . . . .	1165
South African Institute for Medical Research, The—Year Ended December 31, 1932. Annual Report. Department of Industrial Hygiene, and Pathological Department. . . . .	1317
Southern Branch, American Public Health Association. . . . .	Year Book, 28
Southern States, Health Problems Peculiar to the. John A. Ferrell, M.D., Dr.P.H. . . . .	441
Standard Methods for the Examination of Water and Sewage, Seventh Edition. Corrections. . . . .	1179
Standard Methods of Milk Analysis, Proposed Changes in the New (Sixth) Edition of the. Report of the Committee on Standard Methods of Milk Analysis. Robert S. Breed, Ph.D. . . . .	359
Standardization of the Complement-Fixation Test for Syphilis, Abstract of Report of the Referee on the—presented to the Committee on Standard Methods of the Laboratory Section. Ruth Gilbert, M.D., Referee. . . . .	499
Standardizing the Maternal Mortality Rate, Suggested Method of Computing and. Robert J. Lowrie, M.D. . . . .	459
Starkloff, Max C., Retirement of. . . . .	651
Statistics and the Health Officer. George B. L. Arner, Ph.D. . . . .	28
Stone, R. V. A Modified Quevenne Lactometer for the Public Health Laboratory Control of Market Milk. . . . .	929
Story of the Epidemic of Encephalitis in St. Louis, The. Joseph F. Bredeck, D.P.H. . . . .	1135
Straka, Robert P., and James, Lawrence H. Frozen Vegetables. . . . .	700
Streptococci and Leucocytes, Relationships to Fibrosis of the Udder. G. J. Hucker, Ph.D. . . . .	237
Streptococcus and Abortus Examination, Preservation of Milk Samples with Brilliant Green for. C. S. Bryan. . . . .	1182
Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine, With Particular Reference to Swimming Pool Water. W. L. Mallmann, Ph.D., and William Cary, Jr. . . . .	25

	Page
Study of the Brom-Thymol-Blue Reaction in Freshly Drawn Milk, A. C. S. Bryan....	721
Study of the Opsono-Cytophagie Power of the Blood and Allergic Skin Reaction in Brucella Infection and Immunity in Man, A. I. Forest Huddleson, Howard W. Johnson and E. E. Hamann.....	917
Suggested Method of Computing and Standardizing the Maternal Mortality Rate. Robert J. Lowrie, M.D.....	459
Suggested Procedures for the Presumptive Test in the Determination of the Coli-Aerogenes Group. C. T. Butterfield.....	343
Summer School Courses in Public Health.....	541, 650
Sunlight and Health. Haven Emerson, M.D.....	437
Sunshine as a Health Problem of Cities, Loss of Actinic. Fred O. Tonney, M.D.....	775
Supplee, G. C., Ph.D. Antirachitic Activation of Milk by Direct Irradiation with Ultra-violet Rays.....	225
Survey Methods, Effectiveness of Child Health Programs in Ontario by. John T. Phair, M.B., D.P.H.....	1
Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. Report of the Joint Committee on Rural Sanitation of A.P.H.A. and the Conference of State Sanitary Engineers, in coöperation with a committee of the Society of Agricultural Engineers. H. B. Hommon, Chairman.....	Year Book, 116
Sweden—Prenatal and Infant Health Work.....	680
Swimming Pool Water, With Particular Reference to—Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine. W. L. Mallmann, Ph.D., and William Cary, Jr.....	35
Swimming Pools and Bathing Places. Report of the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers. W. J. Scott, Chairman.....	Year Book, 40
Swimming Pools, Application of the Principles of Water Purification to the Control of. A. H. Fletcher and A. E. Clark.....	407
Swimming Pools, Some Factors Involved in the Use of Chloramines for the Disinfection of. A. H. Fletcher and E. C. Link.....	1255
Symposiums:	
Air Hygiene:	
Cohn, Morris M.....	668
Emerson, Haven, M.D.....	437
Gage, Stephen DeM., and Wright, Edward.....	97
Meller, H. B., and Warga, Mary E.....	217
Tonney, Fred O., M.D.....	775
Diphtheria Prevention:	
Godfrey, Edward S., Jr., M.D.....	809
Park, William H., M.D.....	600
Shepard, W. P., M.D.....	547
Epidemic Encephalitis:	
Bredeck, J. F., M.D., D.P.H.....	1135
Leake, James P., M.D.....	1140
Neal, Josephine B., M.D.....	1144
Discussions, by Theodore C. Hempelmann, M.D., Howard A. McCordock, M.D., Ralph S. Muckenfuss, M.D., Thomas M. Rivers, M.D.....	1148
See also Editorial.....	1058
Mental Hygiene:	
Adamson, Elizabeth I., M.D.....	211
Hincks, Clarence M., M.D.....	209
Richards, Esther L., M.D.....	198
Wile, Ira S., M.D.....	191
White, William A., M.D.....	206
Milk of Special Antirachitic Value—Their Development and Use:	
Hardenbergh, J. G., V.M.D., and Wilson, L. T., Ph.D.....	230
Supplee, G. C., Ph.D.....	225
Zucker, Theodore F., Ph.D.....	10
(See also articles by Hess and Mitchell, Eiman, Whipple, and Stokes, in December, 1932, issue; and Report of the Committee on Milk and Dairy Products in 1932-1933 Year Book.)	
Public Health Ten Star Final Special Session:	
Tuberculosis of Bovine Origin. Mazýek P. Ravenel, M.D.....	316
Activities and Trends in the Laboratory Field. George W. McCoy, M.D.....	318
Current Preoccupations of Health Officers. Huntington Williams, M.D., Dr.P.H.	323
Work in Vital Statistics for Public Health. Walter F. Willcox, Ph.D.....	326
The Public Health Engineer's Work. Abel Wolman.....	329
Industrial Hygiene. Alice Hamilton, M.D.....	332
Food and Health. Henry C. Sherman.....	335
Health Education. Iago Galdston, M.D.....	337
Trends in Public Health Nursing. Helen C. LaMalle, R.N.....	339
Current Work of the Section on Epidemiology. Haven Emerson, M.D.....	341
(See also Child Hygiene by James F. Rogers, November, 1932, issue.)	
Sillcosis:	
Gardner, Leroy U., M.D.....	1240
Sampson, Homer L.....	1237
Smith, Clayton S., Ph.D., M.D., and Helen L. Wilkoff, Ph.D.....	1250

	Page
Symposiums—Continued	
Standard Methods:	
Ireed, Robert S., Ph.D.	259
Butterfield, C. T.	343
Gilbert, Ruth, M.D.	499
Corham, Frederic P.	56
Syphilis, Abstract of Report of the Referee on the Standardization of the Complement-Fixation Test for—presented to the Committee on Standard Methods of the Laboratory Section. Ruth Gilbert, M.D., Referee.	499
Syphilis and Gonorrhea, Epidemiology of (followed by Discussion by Edward S. Godfrey, Jr., M.D.). William L. Munson, M.D.	797

T

Taste and Odor Removal Processes. Report of the Committee on Water Supply. J. R. Baylis, Chairman.	Year Book, 126
Ten Star Final Special Session, Public Health:	
Articles by Ravenel, McCoy, Williams, Willcox, Wolman, Hamilton, Sherman, Galdston, LaMalle, Emerson.	316
(See also Symposiums and article by Rogers, November, 1932.)	
Ten Years of Public Health Administration in Ohio. Robert G. Paterson, Ph.D.	1045
Test for Reaction-Producing Substances in Concentrated Antipneumococcal Serum, A—Preliminary Report. L. A. Barnes, Ph.D., and S. D. Kramer, M.D.	616
Test Room Studies in Employee Effectiveness (Western Electric Company). C. E. Turner, Dr.P.H.	577
Testing and Means of Disinfecting Water with Chlorine, Study of Bacteriological Methods of—With Particular Reference to Swimming Pool Water. W. L. Mallmann, Ph.D., and William Cary, Jr.	35
Textile Work and Normal Childbirth in Bavaria.	699
Thelchoff, Eldred V., M.D.:	
Classes for Expectant Fathers.	1200
Report of the Preschool Center Program of the Cleveland Child Health Association.	858
Thompson, Stewart G., D.P.H. Precaution When Filing Deferred Certificates.	567
Titration of the Neutralizing Potency of Anti-Meningococcus Serum by the Phenomenon of Local Skin Reactivity. Grace M. Sickles.	259
Tonney, Fred O., M.D. Loss of Actinic Sunshine as a Health Problem of Cities.	775
Toxic Amblyopia and Accompanying Physiological Disturbances in Carbon Tetrachloride Intoxication. Zolton T. Wirtschafter, M.D.	1035
Toxicity of Organic Fluorides. William P. Yant.	936
Toxin-Antitoxin by Toxoid with a Consideration of the Comparative Dosage, Replacement of. (See Letter to the Editor, from Bradford Massey, M.D., 948) William H. Park, M.D.	600
Toxin, Toxoid, and Diphtheria Antitoxin, and Its Bearing on the Lf Titer, Nonspecific Flocculation of. John F. Anderson, M.D., George F. Leonard, M.D., and August Holm, Sc.D.	681
Toxoid with a Consideration of the Comparative Dosage, Replacement of Toxin-Antitoxin by. (See Letter to the Editor, from Bradford Massey, M.D., 948) William H. Park, M.D.	600
Toxoids, Antigenic Value of Commercial Diphtheria. William Levin, Dr.P.H., and Helen A. Cary, M.D.	1067
Training and Personnel. Report of the Committee on Training and Personnel. C. E. Turner, Chairman.	Year Book, 120
Training of Health Personnel, The. W. S. Leathers, M.D., and A. E. Keller, M.D.	816
Treatment of Water by Certain Forms of Silver, The. James Gibbard.	910
Trends in Public Health Nursing. Helen C. LaMalle, R.N.	339
Triumph for Public Health, A. Editorial.	705
Tubercle Bacilli, Differentiation of Human from Bovine. Editorial.	706
Tubercle Bacilli from the Blood Stream. Editorial.	1171
Tuberculin Skin Test from the School Physician's Standpoint, The. L. W. Childs, M.D.	997
Tuberculosis:	
See Editorial, Tubercle Bacilli from the Blood Stream.	1171
See Sunlight and Health. Haven Emerson, M.D.	437
Tuberculosis, Administration of a Bureau of, in a City Department of Health. H. R. Edwards, M.D.	591
Tuberculosis Among Children, Early Diagnosis of. Elton G. Littell, M.D.	145
Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity, Resident Mortality from. Elizabeth Parkhurst.	901, 1065
Tuberculosis Movement Today, The. Donald B. Armstrong, M.D., Sc.D.	663
Tuberculosis of Bovine Origin. Mazzyck P. Ravenel, M.D.	316
Tuberculosis of Childhood, Recognition and Control. Eugene L. Opie, M.D.	305
Tuberculosis, Risk of Persons in Familial Contact with Pulmonary. W. H. Frost M.D.	426
Tunnel Workers, The Silica Content of the Lungs of a Group of. Clayton S. Smith, Ph.D., M.D., and Helen L. Wikoff, Ph.D.	1250
Turner, C. E., Dr.P.H. Test Room Studies in Employee Effectiveness (Western Electric Company).	577

	Page
Turner, C. E., Dr.P.H., Chairman. Report of the Committee on Training and Personnel. Year Book, 120	120
Types of Epidemic Encephalitis: A Comparison of the Cases Seen in St. Louis in 1933 with Those Seen in New York City. Josephine B. Neal, M.D.....	1144
Typhoid Cases and Deaths in New York State.....	1057
Typhoid Fever:	
See Health Problems Peculiar to the Southern States. John A. Ferrell, M.D.....	441
See The Work of Walter Reed and His Associates of the Medical Department of the United States Army. Major General Robert U. Patterson.....	1127
Typhus and Rocky Mountain Spotted Fever, Laboratory Diagnosis of Endemic. L. F. Badger, M.D. ....	19
Typhus, Endemic. See Health Problems Peculiar to the Southern States. John A. Ferrell, M.D. ....	441

## U

Udder, Relationships of Leucocytes and Streptococci to Fibrosis of the. G. J. Hucker, Ph.D. ....	237
Ultra-violet Rays, Antirachitic Activation of Milk by Direct Irradiation with. G. C. Supplee, Ph.D. ....	225
Undernourished School Children, Relation of the Use of Milk to the Physical and Scholastic Progress of. Fred F. Lininger, Ph.D.....	555
Undulant Fever. ....	449
Unemployment. ....	216
Unemployment on Children and Young People in Germany, The Effects of. Richard A. Bolt, M.D., Dr.P.H.....	744
United States Children's Bureau.....	166
Use of Chloramines for the Disinfection of Swimming Pools, Some Factors Involved in the. A. H. Fletcher and E. C. Link.....	1255
Use of Glycerol as a Preservative for Milk Specimens to Be Examined for Hemolytic Streptococci, The. Ruth Gilbert, M.D., and M. E. Clark.....	720

## V

Vaccination Against Smallpox—Or Not? Editorial.....	351
Vaccination, Nonspecific Immunity by Heterologous. Editorial.....	946
Value of Culture Tests in the Diagnosis of Diphtheria. Hazel M. Hatfield, M.D., and Alice G. Mann.....	847
van Leeuwenhoek, Anthony.....	108
Varianis of Bacillus Megatherium, Some. Georges Knaysi, Ph.D.....	260
Vaughan, Henry F., Dr.P.H., and Hiscock, Ira V., Associate Editors. See Public Health Administration Section.	
Vegetables, Frozen. Robert P. Straka and Lawrence H. James.....	700
Ventilation, Air Conditioning and. Editorial.....	603
Ventilation and Atmospheric Pollution, Report of the Committee on. Emery R. Hayhurst, M.D., Chairman.....	134
Virgin Islands of the United States, School Health Program for the. Sally Lucas Jean.	516
Vital Statistics:	
See Epidemic Encephalitis Symposium.....	1135
See Health Problems Peculiar to the Southern States. John A. Ferrell, M.D.....	441
See Maternal Mortality Study for Cleveland, Ohio. Richard A. Bolt, M.D.....	109
See The Need of an Index Statisticus. A. W. Hedrich, Sc.D.....	1159
See A Plan to Obtain More Accurate Records of Infant Hygiene Field Work. C. A. Sargent, M.D. ....	677
See Resident Mortality from Tuberculosis in Urban and Rural New York According to Age, Sex, Color, and General Nativity. Elizabeth Parkhurst.....	901
See Statistics and the Health Officer. George B. L. Arner, Ph.D.....	28
See Suggested Method of Computing and Standardizing the Maternal Mortality Rate. Robert J. Lowrie, M.D.....	459
Vital Statistics Being Used and by Whom, How Are? Report of the Committee on Forms and Methods of Statistical Practice. A. W. Hedrich, Sc.D., Chairman.....	62
Year Book, 326	
Vital Statistics for Public Health, Work in. Walter F. Willcox, Ph.D.....	326
Vital Statistics Section. Louis I. Dublin, Ph.D., Associate Editor....59, 151, 261, 360, 500, 620, 733, 853, 983, 1072, 1186, 1312	1312
Vital Statistics Section Resolutions Adopted at the Indianapolis Annual Meeting. Association News. ....	1299
Vitamin A Deficiency, A Gauge of—The Incidence of Xerophthalmia and Night-Blindness in the United States. Alfred F. Hess, M.D., and Daniel B. Kirby, M.D.....	935
Vitamin C. Report of the Committee on Nutritional Problems. H. C. Sherman, Chairman. ....	97
Vitamin Content of Cereals, The. Report of the Committee on Cereals and Their Products. F. C. Blanck, Ph.D., Chairman.....	54
Vitamin D Concentrate to Milk, The Addition of. Theodore F. Zucker, Ph.D.....	10
Vitamin D Milk and the Health Officer. Editorial.....	1060

	Page
Vitamin Values of Milk, Natural and Induced Variations in the. H. C. Sherman.....	1031
Vitamins. See Food and Nutrition Section.	
Volatile Solvents, Report of the Committee on. Elizabeth B. Bricker, M.D., Chairman.	
Year Book,	128

## W

Wachter, Leonard M. ....	229
Warga, Mary E., and Meller, H. B. Effects of Air Contaminants on the Natural Light of Cities. ....	217
Washington, Incineration in. John Blake Gordon.....	155
Water, Conservation of. Editorial.....	707
Water Purification to the Control of Swimming Pools, Application of the Principles of. A. H. Fletcher and A. E. Clark.....	407
Water Samples, Present Status of Handling: Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions With Special Reference to the Direct Method. Elfreda L. Caldwell and Leland W. Parr, Ph.D.....	467
Water Sampling Rod, A Deep. Louva G. Lenert.....	856
Water Supply, Report of the Committee on. Taste and Odor Removal Processes. J. R. Baylis, Chairman. ....	Year Book, 126
Water, The Treatment of, by Certain Forms of Silver. James Gibbard.....	910
Water with Chlorine, Study of Bacteriological Methods of Testing and Means of Disinfecting—With Particular Reference to Swimming Pool Water. W. L. Mallmann, Ph.D., and William Cary, Jr.....	35
Wells, W. F. Apparatus for Study of the Bacterial Behavior of Air.....	58
Western Branch, American Public Health Association.....	Year Book, 28
Western Branch A.P.H.A. Inaugural Address. J. L. Pomeroy, M.D.....	813
Western Branch Meeting, The. Editorial.....	708
Western Electric Company. Test Room Studies in Employee Effectiveness. C. E. Turner, Dr.P.H. ....	577
White, William A., M.D. Mental Hygiene of Adolescence.....	206
Whooping Cough for Periods of High and Low Incidence, Seasonal Distribution of. G. E. Harmon, M.D.....	789
Whooping Cough Plates in a Public Health Laboratory. Edmund K. Kline, Dr.P.H....	493
Wilcox, Helen L., Ph.D., and Smith, Clayton S., Ph.D., M.D. The Silica Content of the Lungs of a Group of Tunnel Workers.....	1250
Wile, Ira S., M.D. Mental Health of the Preschool Child.....	191
Willcox, Walter F., Ph.D. Work in Vital Statistics for Public Health.....	326
Williams, C. L., M.D. Fumigation of Foodstuffs.....	561
Williams, Huntington, M.D., Dr.P.H. Current Preoccupations of Health Officers.....	323
Wilson, I. T., Ph.D., and Hardenbergh, J. G., V.M.D. Production of Antirachitic Milk by the Feeding of Dairy Cattle.....	230
Winslow, C.-E. A., Dr.P.H. Industry in Medicine.....	450
Wirschaftler, Zolton T., M.D. Toxic Amblyopia and Accompanying Physiological Disturbances in Carbon Tetrachloride Intoxication.....	1035
Wolfman, Abel. The Public Health Engineer's Work.....	323
Work in Vital Statistics for Public Health. Walter F. Willcox, Ph.D.....	326
Work of Walter Reed and His Associates of the Medical Department of the United States Army, The. Major General Robert U. Patterson.....	1127
Wright, Edward: Discussion of "Aerial Nuisances from the Refining and Burning of Petroleum Oils," by Stephen DeM. Gage, 97.....	102
Shellfish Treatment Plant at Newburyport, Mass.....	266

## X

Xerophthalmia and Night-Blindness in the United States, The Incidence of—A Gauge of Vitamin A Deficiency. Alfred F. Hess, M.D., and Daniel B. Kirby, M.D.....	935
---------------------------------------------------------------------------------------------------------------------------------------------------------------	-----

## Y

Yant, William P. Toxicity of Organic Fluorides.....	930
Year Book, American Public Health Association—1932-1933. Supplement to June, 1933, issue:	
The American Public Health Association—Its Objectives and a Pledge of Their Attainment. ....	Year Book, 5
Affiliated State Public Health Societies.....	Year Book, 27
Bishop, E. L., Chairman. Report of Executive Board to the Governing Council, American Public Health Association.....	Year Book, 29
Committee List, 1932-1933, of the American Public Health Association.....	Year Book, 16
Committee Reports by Sections:	
Food and Nutrition Section Committee Reports:	
Cereals, The Vitamin Content of.....	Year Book, 54
Fruits and Vegetables.....	Year Book, 71
Milk Analysis.....	Not Year Book, 359
Milk and Dairy Products.....	Year Book, 82

## Year Book, American Public Health Association—1932-1933—Continued

## Committee Reports by Sections—Continued

## Food and Nutrition Section Committee Reports—Continued

Page

Oyster Analysis.....	Not Year Book,	56
Seafoods Industries. . . . .	Year Book,	58
Vitamin C . . . . .	Year Book,	97

## Health Officers Section Committee Reports:

Housing of Health Departments.....	Year Book,	50
------------------------------------	------------	----

## Industrial Hygiene Section Committee Reports:

Industrial Fatigue. . . . .	Year Book,	74
Pneumoconiosis. . . . .	Year Book,	100
Ventilation and Atmospheric Pollution.....	Year Book,	134
Volatile Solvents. . . . .	Year Book,	138

## Laboratory Section Committee Reports:

Syphilis. . . . .	Not Year Book,	499
-------------------	----------------	-----

## Public Health Engineering Section Committee Reports:

Farm Sewage Disposal Plants, Survey of Thirty-Five Demonstration.....	Year Book,	116
Industrial Plant Sanitation.....	Year Book,	79
Milk Supply. . . . .	Year Book,	88
Noise. . . . .	Year Book,	92
Public Health Engineering Manual.....	Year Book,	63
Promotion of Environmental Sanitation.....	Year Book,	103
Record Forms. . . . .	Year Book,	108
Sewage Disposal. . . . .	Year Book,	64
Swimming Pools and Bathing Places.....	Year Book,	40
Water Supply. . . . .	Year Book,	126

## Vital Statistics Section Committee Reports:

Forms and Methods of Statistical Practice.....	Year Book,	62
Occupational Mortality Statistics.....	Year Book,	68
Proper Allocation of Records.....	Year Book,	107
Registration Affairs. . . . .	Year Book,	115

## Constitution and By-Laws, and Constitution for Sections, American Public Health Association. . . . .

Executive Office Staff of the American Public Health Association.....	Year Book,	15
-----------------------------------------------------------------------	------------	----

## Hiscock, Ira V., Chairman. Resolutions, adopted by the Governing Council of the American Public Health Association October 26, 1932.....

Publications of the American Public Health Association.....	Year Book,	15
-------------------------------------------------------------	------------	----

## Referees of the American Public Health Association.....

Report of Executive Board to the Governing Council, American Public Health Association. E. L. Bishop, Chairman.....	Year Book,	29
---------------------------------------------------------------------------------------------------------------------	------------	----

## Reports of Committees:

Bathing Places. Swimming Pools and Bathing Places. Joint Report of A.P.H.A. and the Conference of State Sanitary Engineers. W. J. Scott, Chairman. . . . .	Year Book,	40
Business Management. Housing of Health Departments. George C. Ruhland, M.D., Chairman. . . . .	Year Book,	50
Cereals and Their Products. The Vitamin Content of Cereals. F. C. Blanck, Ph.D., Chairman. . . . .	Year Book,	54
Fish and Shellfish. The Need for Improved Sanitation in the Seafoods Industries. A. C. Hunter, Ph.D., Chairman.....	Year Book,	58
Forms and Methods of Statistical Practice. How Are Vital Statistics Being Used and by Whom? 1931 Report. A. W. Hedrich, Sc.D., Chairman.....	Year Book,	62
Forms and Methods of Statistical Practice. Occupational Mortality Statistics. 1932 Report. A. W. Hedrich, Sc.D., Chairman.....	Year Book,	68
Fruits and Vegetables. Walter H. Eddy, Ph.D., Chairman.....	Year Book,	71
Industrial Fatigue. Frederick B. Flinn, Chairman.....	Year Book,	74
Industrial Plant Sanitation. F. G. Legg, Jr., Chairman.....	Year Book,	79
Milk and Dairy Products. W. B. Palmer, Chairman.....	Year Book,	82
Milk Supply. Committee on Milk Supply of A.P.H.A. and the Committee on Milk Sanitation of the Conference of State Sanitary Engineers. C. A. Holmquist, Chairman. . . . .	Year Book,	88
Noise. Hygeia Harkens to Noise. C. R. Cox, Chairman.....	Year Book,	92
Nutritional Problems. Vitamin C. H. C. Sherman, Chairman.....	Year Book,	97
Pneumoconiosis. Report (Joint) of the Committee on Pneumoconiosis and the Committee on Standard Practices in Compensation of Occupational Diseases. R. R. Sayers, M.D., Chairman.....	Year Book,	100
Promotion of Environmental Sanitation. V. M. Ehlers, Chairman.....	Year Book,	103
Proper Allocation of Records. J. V. DePorte, Ph.D., Chairman.....	Year Book,	107
Record Forms. Public Health Engineering Functions of City Health Departments. I. W. Mendelsohn, Chairman.....	Year Book,	108
Registration Affairs. T. F. Murphy, M.D., Chairman.....	Year Book,	115
Report of Executive Board to the Governing Council, American Public Health Association. E. L. Bishop, Chairman.....	Year Book,	29
Resolutions, adopted by the Governing Council of the American Public Health Association October 26, 1932. Ira V. Hiscock, Chairman.....	Year Book,	37



Year Book, American Public Health Association—1932-1933—Continued	
Reports of Committees—Continued	
	Page
Rural Sanitation. Joint Committee of A.P.H.A. and the Conference of State Sanitary Engineers, in coöperation with a committee of the Society of Agricultural Engineers. Survey of Thirty-Five Demonstration Farm Sewage Disposal Plants. H. B. Hommon, Chairman.....	Year Book, 116
Swimming Pools and Bathing Places. Joint Report of A.P.H.A. and the Conference of State Sanitary Engineers. W. J. Scott, Chairman....	Year Book, 40
Training and Personnel. C. E. Turner, Chairman.....	Year Book, 120
Ventilation and Atmospheric Pollution. Emery R. Hayhurst, M.D., Chairman.	Year Book, 134
Volatile Solvents. Elizabeth B. Bricker, M.D., Chairman.....	Year Book, 138
Water Supply. Taste and Odor Removal Processes. J. R. Baylis, Chairman...	Year Book, 126
Resolutions, adopted by the Governing Council of the American Public Health Association October 26, 1932. Ira V. Hiscock, Chairman.....	Year Book, 37
Section Councils of the American Public Health Association.....	Year Book, 14
Southern Branch, American Public Health Association.....	Year Book, 28
Western Branch, American Public Health Association.....	Year Book, 28
Yeast Extract Medium for Determining the Bacterial Content of Milk by the Plate Method, A. E. D. Devereux and J. L. Etchells.....	149
Yellow Fever. See America's Contributions and Problems in Public Health. John A. Ferrell, M.D. ....	1115
Yellow Fever in Panama Canal Zone and Cuba, Eradication of. The Work of Walter Reed and His Associates of the Medical Department of the United States Army. Major General Robert U. Patterson.....	1127
Your Association. Editorial.....	246
Yugoslavia, Meals for School Children in.....	245

## Z

Zucker, Theodore F., Ph.D. The Addition of Vitamin D Concentrate to Milk.....	10
-------------------------------------------------------------------------------	----

S.M.S. MEDICAL COLLEGE,  
LIBRARY, JAIPUR.

